SCIENCE

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THE DUTIES AND RESPONSIBILITIES OF TRUSTEES OF PUBLIC MEDICAL INSTITUTIONS.*

THE value of occasional and stated gatherings of the principal leaders of medical thought in the various special departments is acknowledged by all. Certainly those who have attended this congress, now held for the sixth time, have felt its broadening influence. We are all apt to become narrow when we are devoted heart and soul to one specialty, be it medicine, surgery, physiology, ophthalmology or any other. When we meet nearly all the more prominent men in cognate interrelated branches of medicine in Washington every third year, we are sure to find that there are as interesting and as important questions in other specialties as there are in our own; and, moreover, we are sure to find that there are men of as acute intelligence, wide reading and original thought in other than

* The presidential address at the sixth congress of American Physicians and Surgeons, Washington, May 12, 1903.

our own departments whom it is our pleasure to meet, and whose acquaintance becomes not only valuable for what we find them to be, but because of the stimulus that they give to our own thoughts.

Ordinarily the presidential address has been devoted to some special professional topic. My first idea was to select such a subject for to-night, but as I was absent from the country when I received the very highly appreciated notice of my selection, I asked the members of the executive committee for suggestions, being sure that their united judgment would be better than my own. I was very glad when they proposed the topic upon which I shall address you, partly because it is different from the usual type of such addresses, and partly because it seems to me appropriate to the present time. I shall, therefore, give the time at my disposal to presenting to you some thoughts on 'The Duties and Responsibilities of Trustees of Public Medical Institutions.'

Before entering upon my topic I beg to state explicitly that what I may say is offered in no spirit of unfriendly criticism, but only by way of friendly suggestion. I have been too long and too intimately associated with scores of such trustees not to know that they are almost without exception generous, self-sacrificing, giving of their time and money and thoughtful care without stint and often sacrificing personal convenience and comfort for the good of the college or hospital which they so faithfully serve. Anxious to discharge their trust to the best of their ability, I am sure they will accept these suggestions, the fruit of forty years of personal service as a teacher and a hospital surgeon, in the same friendly spirit in which they are offered.

There are two such classes of institutions to be considered: (1) Medical colleges, and (2) hospitals, whether they be connected with medical schools or not.

There is, it is true, a third class of trustees for a wholly new kind of medical institution which has arisen as a modern Minerva Medica, born full-armed for the fray. Of this class we have as yet but a single example—the Rockefeller Institute for Medical Research. Akin to it are laboratories for special investigations, such as the two cancer laboratories in Buffalo and Boston. But the Rockefeller Institute is so recent, and its scope at present necessarily so undetermined, that I would not venture to consider the duties of these trustees, and I am sure their responsibilities are adequately felt by them. Moreover, their admirable selection of a director for the institution is the best pledge of a future wise administration. I heartily congratulate the profession and America upon the establishment of so peculiarly useful an institute. Its founder has wisely left its work unhampered saving as to its general purpose, and the whole world, and especially the United States, will soon be his debtor for researches and discoveries that will abridge or even abolish some diseases, shorten sickness, prolong life and add enormously to the sum of human happiness. Could any man of wealth by any possible gift win for himself a higher reward or a happier recollection when he faces the future world?

Though not a medical institution, I can not refrain also at this point from expressing not only for myself, but for you, our hearty appreciation of what the Carnegie Institution has done for medicine in the reestablishment of the 'Index Medicus.' This publication is essentially and peculiarly American in origin, but its usefulness is worldwide. It aids alike an author in Japan or in India, in Europe or America. It is one of the best and wisest under-

takings of this lusty educational giant. But to ensure the permanent publication of the 'Index Medicus' the profession must show that it really values this generous gift. Unless the 'Index' finds a hearty support in the profession abroad and especially at home, we can hardly expect the continued publication of this unique and invaluable publication. May I earnestly ask, therefore, of this audience of the chief medical authors of the United States that each one will demonstrate his appreciation by an immediate subscription to the 'Index Medicus.'

There are some matters common both to the medical college and the hospital which may be considered together. The most important of all these is the cordial and hearty cooperation of the medical men connected with the college or hospital and the boards of trustees. In order to ensure this the members of each body must be acquainted with each other. I have known of instances in which if a professor in the medical school ventured to suggest any changes as to its management, or even to state his opinion as to the qualifications of a candidate for a vacant professorship, his suggestions were resented as an interference instead of being welcomed as a means of valuable information. I take it for granted that we should not offer such suggestions after the fashion of a partisan either of a man or a measure, for the advancement of a friend or to the disadvantage of an enemy, but solely for the good of the institution with which we are connected. He who would endeavor to foist a friend upon an institution *because* he is a friend, and in spite of the fact that a rival is the abler man and better fitted for the position, is just as false to his duty to his college or to his hospital, as the trustee who would vote for the less desirable man on the ground of personal friendship or of association in some society, church or other similar body. Of all these influences, that arising from membership in the same religious body is, I fear, the most frequent and yet most absolutely indefensible. What one's theological opinions are has no more to do with his qualification for a professional or hospital appointment than his opinions on protection as against free trade, or whether Bacon or Shakespeare wrote Hamlet.

I have always honored one of a board of trustees, who was an old personal friend of my father's and who had known me from boyhood, yet who in my early professional career, when I asked for his vote for an important hospital appointment, had the manly courage to tell me that he thought a rival, who was older and more experienced, was the better man for the place and that he should, accordingly, vote for him and not for me. I confess it was at the time a bitter disappointment to me, but I never had so high an opinion of my father's friend as after he denied me his vote.

There should be, in my opinion, but two questions asked in considering the election of either a professor or a hospital physician or surgeon. First, which one of the candidates for the place has the best qualifications from the medical point of view? This should include not only his scientific knowledge, but his ability practically to impart or to apply that knowledge. Secondly, are his personal qualifications and character such as to make him a desirable incumbent of the position? It must be remembered that a man may be scientifically and practically an extremely able man, but of such a quarrelsome disposition, or the unfortunate possessor of some other similar personal disqualification, as to make him a most undesirable member of a staff. The personal equation may be

quite as important as the scientific qualification. Of course his personal moral character should be above reproach. To place a drunkard or a libertine in a position of so much responsibility and influence is to abuse a trust. No patient should be confided to the care of such a man and still more no such man should be made an instructor of young men, upon whom his influence would be most disastrous.

It is often extremely difficult for a layman to reach a correct conclusion as to the qualifications of medical men for college or hospital appointments, because of the confident, yet conflicting, statements of their friends. But there is apt to be a certain clear partisanship in such statements which betrays the purpose of the speaker. Especially will this be so if he advocates the election of A or B on the lower grounds of friendship, social position, or for other similar motives. The man who is advocating the best man because he *is* the best man has the stamp of sincerity upon every word.

Perhaps the most striking example I can advance of such an unfortunate misjudgment is Dr. S. Weir Mitchell, who was denied a professorship in both the medical institutions of his native city, thus depriving them of the most brilliant medical genius that America has produced within my personal recollection. For him it is now a matter of indifference, and for American literature it has been a gain. But for medicine, and especially for physiology, it was an immense loss. Both of his rivals were estimable, worthy gentlemen who held an honorable position in the profession, it is true, but Mitchell is a genius. 'Eclipse was first; the rest were nowhere.'

One of the best methods of bringing the medical board and the board of trustees into more intimate contact would be to have the dean or a committee of the faculty, or, in a hospital, if the staff is not too large, the whole staff invited to the meetings of the board. Here I can speak from personal experience. At the Orthopedic Hospital and Infirmary for Nervous Diseases in Philadelphia, there are three surgeons and three physicians. These members of the medical staff are invited to meet with the board of managers at each monthly meeting, excepting the annual meeting, when the medical staff is elected. They are free to express their opinions on any topic relating to the management of the hospital to which their judgment may contribute something of value, but when a decision is taken they have no vote. It is purely in an advisory capacity and for the purpose of giving and receiving information that they are present. The plan works exceedingly well. When economy is necessary in the hospital, the staff is fully acquainted with the fact and can cooperate with the trustees; when expenses have run up from carelessness in the wasteful use of dressings or appliances, a halt is called; when, alas, very rarely, the treasurer is all smiles, and plans for the extension of the hospital, or the installation of some new addition to the plant is contemplated, their knowledge as to the necessity, for instance, of a hydrotherapeutic or an x-ray plant, or a new operating room, is of the greatest possible value. Nothing but good, in my opinion, can come from such personal cooperation.

One of the difficult questions which boards of trustees have to face is whether there shall be a fixed age at which a college professor or a hospital physician or surgeon shall retire from the active duties of his post. I firmly believe that they should fix such a retiring age in the interest of the students and the patients. As age advances, a man's opinions and his

practise become 'as petrified as his arteries.' He is incapable of constant study, of adding to his knowledge or of keeping up with the feverish strides of medicine. He ought then to be relieved of his cares and his duties. If no rule exists, he is allowed to continue his inefficient or even disastrous work, or by some harsh suggestion is compelled to give place to another more competent man. A rule is a condition accepted when he is appointed, and just as in the army and navy, when an officer reaches 64 or 62 years of age he is retired on reduced pay, and because it is a rule he does not feel hurt or humiliated; so in a college or a hospital, when time and the rule brings us to the period when we must gracefully retire, no one's reputation is injured or his feelings lacerated.

I have ascertained that the following rules are now in force in some of the larger institutions:

At Harvard, the age when a professor may request to be retired is 60, provided he has been in the service of the university for 20 years, with a reduced pay ranging from one third to two thirds of his salary. At 66 he may be retired by the president and fellows partly or wholly. The details of the plan are admirably arranged.

At Chicago, while no plan is yet in force, largely, I presume, because of its recent establishment on the present basis, such a plan will soon be made operative.

At Columbia the retiring age, after 15 years of service, is 65, either at the request of the professor or upon motion of the trustees, and on half pay.

At Yale the retiring age is 65, after 25 years of service, and on half pay, but the retirement is not compulsory. It will probably be made compulsory before long.

At Cornell the retiring age is 70, but the pension fund will not be available until 1914. The retiring pension will then be $1,500.

At the University of Pennsylvania and at Johns Hopkins no retiring age is fixed.

The only hospitals I know of in which a retiring age is fixed are the Massachusetts General Hospital and the Boston City Hospital. At the former the compulsory retiring age of the surgeons is 63, and of the physicians 65. At the Boston City Hospital the visiting surgeons are retired at 65, but the physicians, gynecologists and all the other medical officers continue in service indefinitely—a very curious anomaly.

These varying but in the main identical provisions, when any exist, show the trend of thought and practise. They generally apply to the medical department, except that in case a professor is engaged in the practise of his profession and so has a private income, the provision for continuing a portion of his salary does not apply. This is right and fair. Of course, in all hospitals where there are no salaries, no provision as to reduced salary would obtain.

The point I wish to emphasize is, however, that the age limit (which in my opinion should be 65) should be *compulsory* and so not be invidious in any given case. It will be objected that not a few men are in full intellectual and physical vigor at 65, and it will be a detriment to the institution to lose their services when their ripe experience and admirable teaching are most desirable. I admit it. But for every one such case of harm done by compelling a man to stop, there are a score of instances of men who are doing vast injury by their inefficiency. Moreover, in the very few cases in which it might be allowable, as boards of trustees make rules they can unmake them, and in special cases they could pay a graceful compliment and

preserve to the institution their exceptional men by extending the limit to 70. In no case can I think it wise to go beyond this limit.

In some of the universities I have quoted a sabbatical year of rest or study is allowed a professor. He is put upon half pay and his place is filled by a temporary substitute, who receives the other half of his salary. I believe that in present conditions this should not be applied to medical faculties, for nearly all of the professors are in active practise and take sufficiently long summer holidays. These latter are often spent in observation and study abroad—a most useful and remunerative employment of a holiday—and serve the purpose of the sabbatical year for men whose entire time is given to their teaching. In hospitals it certainly should not apply.

One of the recurring questions in hospital and college management is whether there should be a certain number of doctors on the board. I know that there is a wide diversity of opinion upon this point. My own belief is that a small proportion of well-chosen medical men is a distinct advantage in such boards of trustees. I have said a 'small proportion,' for it should not be, I think, larger than probably 20 per cent.; and I also said 'well-chosen'; that is, they should be men of large mental caliber and executive ability. It should be distinctly understood, if not indeed absolutely expressed, in institutions in large cities at least, that any physician or surgeon placed upon such a board should never be eligible, even by resignation from the board, for a position on the faculty or the medical staff. In small towns the lack of suitable persons for hospital trustees and members of the hospital staff might make it desirable not to institute such a rule.

Moreover, such medical men should be selected for trustees as by their mental training, social relations and personal character would be, so far as it is possible for human nature to realize such a position, absolutely free from influences arising from personal jealousy or professional bias. If it were a social club, it would be perfectly proper to vote against a man because he is personally distasteful, but where it is a scientific body responsible for the education of large numbers of young men and for the care of still larger numbers of hospital patients among the poor, even if a candidate were personally unfriendly I should vote for his election if he were the man best fitted for the place.

Turning now to the duties and responsibilities peculiar to trustees of hospitals, let me point out the objects of a hospital.

First, the care and the cure of the sick and injured; secondly, the education of medical men and medical students; and thirdly, the promotion of knowledge, which, in turn, will inure all over the world to the more speedy and certain cure of the sick and injured, and so be of the greatest benefit to humanity.

In order to accomplish these three purposes, it is necessary that the hospital shall have sufficient funds to purchase ground, erect buildings and provide a thorough material equipment. It is a great pleasure to me, as to you also, to note that throughout the length and breadth of the land the medical and surgical staff never tax the always inadequate resources of hospitals for any remuneration. They serve without pay, they give ungrudgingly and freely day and night to the poor, often for many years, their time and skill without ever a thought of any money reward. Their reward comes from increased knowledge and skill, and the daily blessing invoked of heaven, often lisped in children's prayers or breathed in mothers' benisons which

pass not unheeded by the recording angel.

But, as I have pointed out elsewhere, instead of receiving any pay, they give to hospitals. The mere money value of this daily gift of the profession to the poor amounts to an enormous sum. The value of the professional services of the staff of the Jefferson Medical College Hospital, a single hospital in a single city, on a moderate basis of fees, I found was more than half a million dollars annually. The millions upon millions of money given in that most self-sacrificing form—personal service—by the entire profession all over the United States, and I might add with still further pride, all over the world, is simply incalculable. The Gideon Grays and Weellum MacLures are not found only in Scotland or at the countryside. They are even more plentiful in the slums of our great cities, giving of their time, their skill, and what is more, their hearts, their lives, themselves to the service of humanity.

Trustees sometimes seem to take it for granted that their duties are ended when they have done two things: begged or given and safely invested the necessary funds, and then elected the staff. To my mind, their duties do not by any means end at this point. They should see to it that the resources of the hospital are utilized to the utmost in doing the largest good.

Let us see now how the objects of a hospital, as I have stated them, can be realized. The first object is the care and cure of the patients. But the cure of any individual patient is not the 'be all and the end all' of a hospital. His cure must be a means of larger vision to the doctor, who will thus be better fitted to care for future similar cases. Even his death, if he can not be cured, should minister to the increasing knowledge and skill of the doctor, so that he may be able to snatch future victory from the present defeat.

The second—the training of doctors and students—is frequently carried out, but sometimes even objected to. There are three classes of doctors who are trained by a hospital: first, the staff of the hospital itself. I have lived through the period of the establishment of hospitals in many of the smaller cities and towns, and in some cases even villages in this country, for it was a rare thing in my early professional life for any except the larger cities to have hospitals. The moment that a hospital is established with its medical and surgical staff, that moment a new era has dawned on the community in which the hospital is established. More careful methods are introduced, greater cleanliness is observed, hygienic conditions are bettered, laboratory methods are inevitably introduced in time. Even if the old-timers who graduated years before our modern laboratory methods were adopted do not care for them or can not use them, the young fellows who come fresh from our medical schools and serve as residents, and even the nurses graduated from our training schools, finally shame the older ones into better ways and greater exactness, not only in the hospital, but in their private work as well.

As a consequence of the establishment of these hospitals and the added skill and training of the local physicians and surgeons, the character of the consultations of the physicians and surgeons of our great medical centers has been greatly modified. The really simple cases, such as hydrocele and small tumors (and even large ones), clubfoot, harelip, etc., which used to be sent to city consultants, are now successfully operated on by the local surgeons, and only the more difficult, serious or complicated cases are sent to the cities. This is a great advantage to the patient, whose good is the first consideration, and to the local medical

men; and though seemingly a serious loss to the city consultant, it is in the end an advantage, as he must prove his better metal in the higher scientific fields and be, as well as seem to be, the better man.

Moreover, the trustees of every hospital should see to it that a good library and laboratory are provided. Insensibly the staff will read more and more. A single restless, progressive spirit, even though it be a young interne, calling attention to this case and to that, in one journal or another, will compel the rest of the staff to read in spite of themselves. It is absolutely clear that a laboratory with modern equipment for bacteriological, pathological and chemical research in its examination of tumors, of the urine, the sputum, the feces, the blood, the pus, and other fluids from wounds, etc., is a necessity in every hospital. Even many of our smaller hospitals are equipped with microscope and reagents if not with a complete bacteriological outfit, which nowadays is inexpensive and imperative. All of this raises the intellectual and professional standard of the staff. I venture to say that no town of 20,000 people can afford to be without its hospital for the sake of its *own citizens,* utterly irrespective of the good it does to the poor who are treated in its wards. It must be established in the interest of the *well-to-do citizens* and their families, so that they may secure better equipped doctors for themselves as well as for the patients in their hospital. Self-interest, therefore, will compel every community to establish its hospital, even if charitable motives had no influence.

Again, the trustees of all hospitals of any size should establish a training school for nurses. Only those who, like myself, have lived in the period before such training schools were established, can appreciate the vast improvement effected in a hospital by this change. To replace the former ignorant, untrained attendants by 'trained nurses whose jaunty caps and pretty uniforms and often winsome faces almost make one half wish to be sick, and when one is sick, half loath to be well,' is not only a boon to the patients but to the doctors as well. The intelligent, well-trained nurse, who is on the alert to observe every important change of symptoms and who will keep accurate bedside notes, is the doctor's right hand. Not a few patients who would otherwise lose heart and hope are, one may say, lured back to health and happiness by the tactful attentions and restful but efficient care of such a nurse. The community of the well-to-do also are benefited, because the hospital provides them with skilled nurses in their homes when they are so unfortunate as to be compelled to remain there instead of going to the hospital.

The old repugnance to entering a hospital when sick or when an operation is demanded is rapidly fading away. The immense advantages of a good hospital over the most luxurious home are now acknowledged on all hands. The poorest patient in a hospital is better cared for, his case more carefully investigated by bacteriological, chemical and clinical methods in a hospital, than are the well-to-do in their own homes. Indeed, wise surgeons, except in cases of emergency, now very properly refuse to do operations in homes instead of in hospitals. In many instances lives that would be lost in homes are saved in hospitals, where the many and complex modern appliances for every surgical emergency are provided.

The hospitals in direct or indirect connection with medical schools, however, do a far larger work than merely the training of their own staffs of doctors. They train three other classes of doctors: First,

the undergraduates who are aspiring to the degree; secondly, graduate physicians who spend a certain amount of time in the hospitals either as internes or as temporary students refurbishing their professional knowledge; and thirdly, experts in certain branches of medicine and surgery.

The undergraduates are taught first in the general clinics, where to some extent they learn both by didactic instruction and by seeing the patients, hearing their histories and witnessing the institution of proper treatment by prescription, by regimen, or if necessary, by surgical operation. This is of great value, particularly in the more important cases, and especially, for I speak now as a surgeon, in important operations. It is often objected that students see nothing in large clinics. To some extent this holds good; but no student can look on at an operation when the jugular vein or the lateral sinus is torn, the pleural cavity opened, the bowel lacerated, or other of the great emergencies of surgery occur, and fail to be impressed by the coolness of the operator, the carefully explained methods adopted for remedying the mischief, and the various devices used to save life, all of which hereafter will be used by him when similar emergencies may occur.

Yet far more important than the public clinics are the smaller clinics held with classes of ten to twenty men each, when under an experienced teacher the absolute work of the clinic is divided among the various students in turn, watching the pulse and the respiration, giving an anesthetic, assisting actively at operations, percussing the chest, palpating the abdomen, determining inequalities of the surface or the varying density of underlying organs. Here is the real forum in which our modern medical student acquires his skill. In many cases visits in the ward itself are made, and to a small group around the bedside the physician or surgeon will point out the phenomena to be recorded, the need for the examination of the blood, the results of bacteriological cultures, the facts discovered by the microscope, or the chemical reagent. By the Socratic method also, he will reveal to the student the imperfection of his knowledge, call out—e-ducate—his powers of observation, of reasoning; stimulate his thought, and give him an impetus which will last throughout life. Who that has 'walked the hospitals' with a Skoda, a Trousseau, a Nélaton, a DaCosta or a Mitchell can ever forget their teaching?

It is sometimes objected by those who are not familiar with the actual facts, and especially by trustees, that this method of actual bedside instruction does harm to the sick. I speak after an experience of nearly forty years as a surgeon to a half dozen hospitals and can confidently say that I have never known a *single patient* injured or his chances of recovery lessened by such teaching. Of course, the physician or surgeon uses common sense. He would not allow a number of men to palpate the abdomen of a patient with peritonitis, or move an acutely inflamed joint, nor would the physician allow a patient with pneumonia to have the chest unduly exposed, or a typhoid fever patient disturbed if his condition were such that it would be inadvisable. But such cases are the exception. In fact, many of you are familiar with patients who have responded to repeated percussion by members of such a class by prompt recovery, attributed by the patient to the supposed medication of percussion. Moreover, it is by this actual practice only that the student acquires the necessary skill in the use of modern instruments of precision, such as the stethoscope, the laryngoscope, the esthesiometer, the

sphygmomanometer, the various specula. Here he learns when to make blood counts, how to take histories, arrives at the actual facts by skilful cross-questioning, notes the varying symptoms and physical signs of a case, determines the need for laboratory investigations, all under the guidance of skilled observers, who will point out his errors, encourage his queries and stimulate his thought.

Moreover, trustees may overlook one important advantage of a teaching hospital. Who will be least slovenly and careless in his duties, he who prescribes in the solitude of the sick chamber, and operates with two or three assistants only, or he whose every movement is eagerly watched by hundreds of eyes, alert to detect every false step, the omission of an important clinical laboratory investigation, the neglect of the careful examination of the back as well as of the front of the chest, the failure to detect any important physical sign or symptom? Who will be most certain to keep up with the progress of medical science, he who works alone with no one to discover his ignorance; or he who is surrounded by a lot of bright young fellows who have read the last *Lancet,* or the newest *Annals of Surgery,* and can trip him up if he is not abreast of the times? I always feel at the Jefferson Hospital as if I were on the run with a pack of lively dogs at my heels. I can not afford to have the youngsters familiar with operations, means of investigation or newer methods of treatment of which I am ignorant. I must perforce study, read, catalogue and remember; or give place to others who will. Students are the best whip and spur I know.

Of the value of training graduates in postgraduate work I need scarcely speak, to this audience at least. The doctor who graduated five, ten or fifteen years ago comes to our great centers of medical education and renews his youth at the fountain of knowledge. He learns the use of all the new instruments, sees new methods of operation, new methods of treatment, new means of diagnosis, and goes home an enormously better equipped man.

The trustees should see that the staff does not become fossilized by following the same ancient local methods from year to year, but should encourage them to visit other hospitals, see other men operate, hear other men discourse on the latest methods of investigation, and then import into their own hospitals all the good found elsewhere. I learn a deal by such frequent visits to the clinics of my brother surgeons, and if one who has grown gray in the service can thus learn, surely the younger men can do so. When we are too old to learn we are too old to remain on a hospital staff.

I do not know anything which has more impressed upon me the enormously rapid progress which surgery is making than a recent experience. I was absent from this country for almost a year and a half. In that time circumstances were such that I saw almost no medical journals and but few doctors. I have been home now eight months and even with incessant work I have not yet caught up, so rapid has been the progress of surgery in this short time. Had I been absent for five years, verily I should have been a 'back number,' and never could have caught up at all.

In his very excellent presidential address before the Association of American Physicians in 1901, Professor Welch made a plea for hospitals to afford 'the requisite opportunities to young men who aim at the higher careers in clinical medicine and surgery.' He called attention to the fact that in our bacteriological, pathological and anatomical laboratories the opportunities, though still too few, were reasonably good, and in a

few places exceptionally good, for the training of young men for positions as teachers of anatomy, pathology and bacteriology. Any young man in these departments who by good hard work makes for himself a name is fairly sure, before long, of being called to some important post as a professor, director of a laboratory, or some similar position. But the opportunities for work in clinical medicine and clinical surgery are far more restricted, since opportunities for both the exercise of their clinical skill are less frequently open to them and the opportunities of combined physiological, pathological, bacteriological and anatomical research along with their clinical work is but scantily provided for. This plea is reinforced by the recent paper of Sir Michael Foster (*Nineteenth Century*, January, 1901, p. 57). These special graduates, bright young men, determined to devote themselves to one or another department of medicine or surgery, are the men who bring honor to the school at which they obtain their training, and are invaluable to the community. They are the future Jenners, Pasteurs, Virchows, Listers, Da-Costas and Grosses, and our hospitals should provide for these exceptional men exceptional facilities.

The third object of a hospital is the promotion of knowledge, and so, fourthly, the good of humanity. Physicians and surgeons engaged only in private practice do not generally keep notes of their cases, and rarely publish important contributions to knowledge. I find in 100 books taken consecutively in my library that 85 were written by hospital men and only 15 by authors not connected with any hospital so far as was indicated on the title page.

In order that proper investigations may go on, trustees should enforce a permanent record of all the cases treated in the hospital, properly indexed, from which the staff may derive their data for papers and books. Each large hospital should have its pathological resident as well as the clinical residents in the various wards, so that post-mortem records shall be well kept, pathological, bacteriological and chemical investigations of various secretions, or blood counts, etc., shall be properly made and permanently recorded in such a manner as to be accessible.

It is too often the case that trustees, as I have said, regard their duties and responsibilities at an end when they have taken care of the funds and elected the staff. They may say that after all this is their real duty, and that all that I have advocated is medical and surgical, and the responsibility for it should devolve on the staff and not on the trustees. I do not take so narrow a view of the duties of trustees. When they have elected a physician or surgeon, if he neglects his duty, it is their business to displace him and fill his place with another man who will attend to his duty, and the duties that I have indicated pertaining to the increase of knowledge as well as of its diffusion are quite as much within their province as it is to see that the funds are invested to the best advantage. The intellectual funds as well as the invested funds must bring in good dividends.

If trustees and staff work together for such a purpose and in such a manner, they will create an ideal hospital which will do more good to the patients than any other type of hospital. It will attract the best physicians and surgeons in every community, will acquire the best reputation, not only local, but it well may be national, and do the most for the good of science and the benefit of humanity.

It may be said that this is an unduly strenuous view of the duties of trustees,

that in our father's day and in our own earlier lives no such conditions existed or were contemplated. "I need hardly ask a body like this," said President Roosevelt in addressing the Methodists assembled in council, "to remember that the greatness of the fathers becomes to the children a shameful thing if they use it only as an excuse for inaction instead of as a spur to effort for noble aims. * * * The instruments with which and the surroundings in which we work have changed immeasurably from what they were in the days when the rough backwoods preachers ministered to the moral and spiritual needs of their rough backwoods congregations. But if we are to succeed, the spirit in which we do our work must be the same as the spirit in which they did theirs."

Moreover, we must remember that "the world-field into which all nations are coming in free competition by the historical movement to which all narrower policies must sooner or later yield, will be commanded by those races which, in addition to native energy and sagacity, bring the resources of scientific investigation and of thorough education." The international race for the leadership of the world is just as strenuous and intense in medicine as it is in commerce. If we are going to join the race and win the prize there must be the highest development of American education at the top. The best men must be pushed to the front, and ample opportunities for growth, for investigation and for original research must be provided. Never has there been so large an opportunity for the man of large ideas, complete education and indomitable energy and purpose as there is to-day. The world is waiting, looking, longing for him, and will cry 'Make room' for him when he is found.

In the hands of the trustees of our colleges and hospitals are the money and the opportunity for developing such men. If the right spirit pervades both trustees and medical faculties and hospital staffs, then it will be but a short time before America will lead the world in medicine as well as she now does in commerce.

Will the profession rise to the level of their great opportunity? Yea, verily they will! Never yet have they been wanting when the emergency arose; not only the emergency of labor, but also the emergency of danger.

In Russia the common soldier counts for little. Yet in Vladikavkaz (where the Dariel Pass—the old Portæ Caspiæ of Herodotus—leading from the Caucasus joins the railroad from Baku on the Caspian to Moscow) is a monument to a common soldier. At the last battle in which the Russians won the victory over Schamyl which gave them undisputed sway over the Caucasus, this soldier blew up a mine and won the day at the cost of his own life. It was ordered that his name should never be erased from the list of his company. At every roll-call when his name is reached, the solemn answer is given 'Died in the service of his country.'

In our hospitals lurk the deadly breath of diphtheria, the fatal virus of bubonic plague, of cholera, of yellow fever, of typhus fever, and the ever present danger of blood poisoning. I have known of brother physicians who have died victims to each one of these scourges. Yet who has ever known one of our guild to shrink when danger smote him on the right hand and the left and death barred the way? As brave as the Russian soldier, ready to risk life, and, if need be, to lose it, these martyrs to duty shall never have their names stricken off the honor list, and at the last roll-call the solemn reply shall be, 'Died in the service of humanity.'

W. W. Keen.

Jefferson Medical College,
Philadelphia.

THE NEW MEDICAL BUILDINGS OF THE UNIVERSITY OF TORONTO.

THE new buildings for the department of physiology and pathology of the University of Toronto, which are to be formally opened in October next, are the first to exemplify the unit system of laboratory construction proposed by Professor Minot,* of Harvard University, and consequently an account of them may be acceptable to all who are interested in laboratory administration and construction.

The main features of the unit system, as outlined by Professor Minot, are all comprehended in the character of the laboratory 'unit' room. This must, first of all, be no larger than is required to accommodate readily the maximum number of students whose practical instruction a single demonstrator can efficiently guide and control. It must also be of such dimensions that it can, at need, be made to serve as a museum, a library or reading room, or a small lecture room. The units, further, must be so placed with respect to one another, preferably in pairs or series, that, by the removal of the partitions separating them, rooms of larger dimensions may, when desired, be obtained at a minimum cost and in a short time. The dimensions of such a unit, as determined by Professor Minot, are 23 x 30 feet, and this room will accommodate twenty-four working students, which number, experience shows, is the largest that should be under the supervision of a single class demonstrator.

The system, as may be seen, offers the great advantage of elasticity, for a laboratory director may enlarge or contract, at will, or according to the needs of the occasion, the accommodation required for a class, a feature that does not obtain in any other system of laboratory construction. It has also other and not less important advantages. The cost of construction is less than in any other system, it adequately provides for the all-important question of light, and it permits of subsequent extensions and additions without disturbance of the original arrangements. It is also to be noted that the system provides for the formation of smaller rooms through the division of the unit.

All these points were thoroughly canvassed when, nearly two years ago, the medical faculty of the University of Toronto took up the question of erecting new laboratory quarters for physiology, physiological chemistry, pathology and public health, and discussed the various plans of construction offered. The result was that the faculty unanimously recommended the adoption of the unit system for the proposed laboratories. The university trustees accepted the recommendation, and construction, begun in August last year, has progressed so rapidly that the buildings are completed and the equipment is now being put in. The whole is, therefore, at the moment in such a stage as to permit one to say to what extent the object sought has been attained.

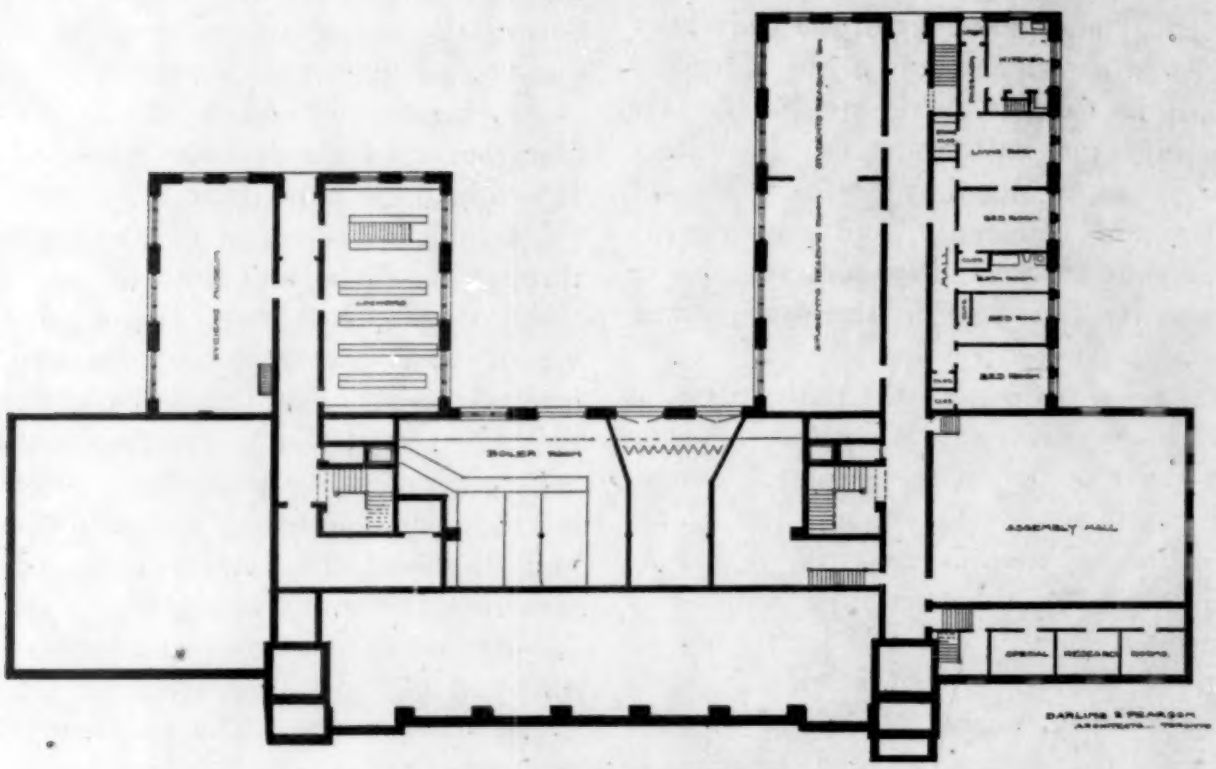
Architecturally, so far as the exterior is concerned, the utmost has been done, considering the difficulties that the enormous window space interposed. The appearance of the buildings, however, is, on the whole, very acceptable.

The interior, on the other hand, is very satisfactory. The accommodation it furnishes, as well as the conveniences of arrangement it offers, is sufficient to demonstrate the great advantages of the unit system over the common, more or less haphazard, system of laboratory construction everywhere illustrated.

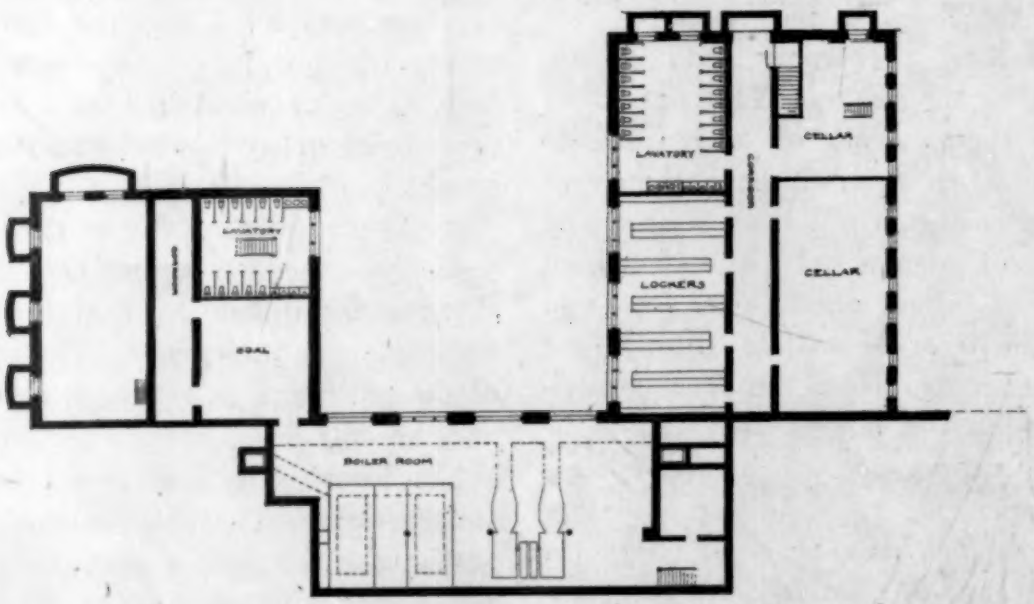
The buildings are to house physiology, physiological chemistry, pathology and

* *Philadelphia Medical Journal*, Vol. VI., p. 390, 1900; SCIENCE, Vol. XIII., p. 409, 1901.

public health. The wing to the right, as shown in the accompanying diagrams, accommodates physiology and physiological chemistry and contains, in addition to the lecture theaters, twelve units and eight half units. The other departments occupy the main portion and the left wing, which contains sixteen units and fourteen half units.



MEDICAL BUILDING TORONTO UNIVERSITY
BASEMENT PLAN

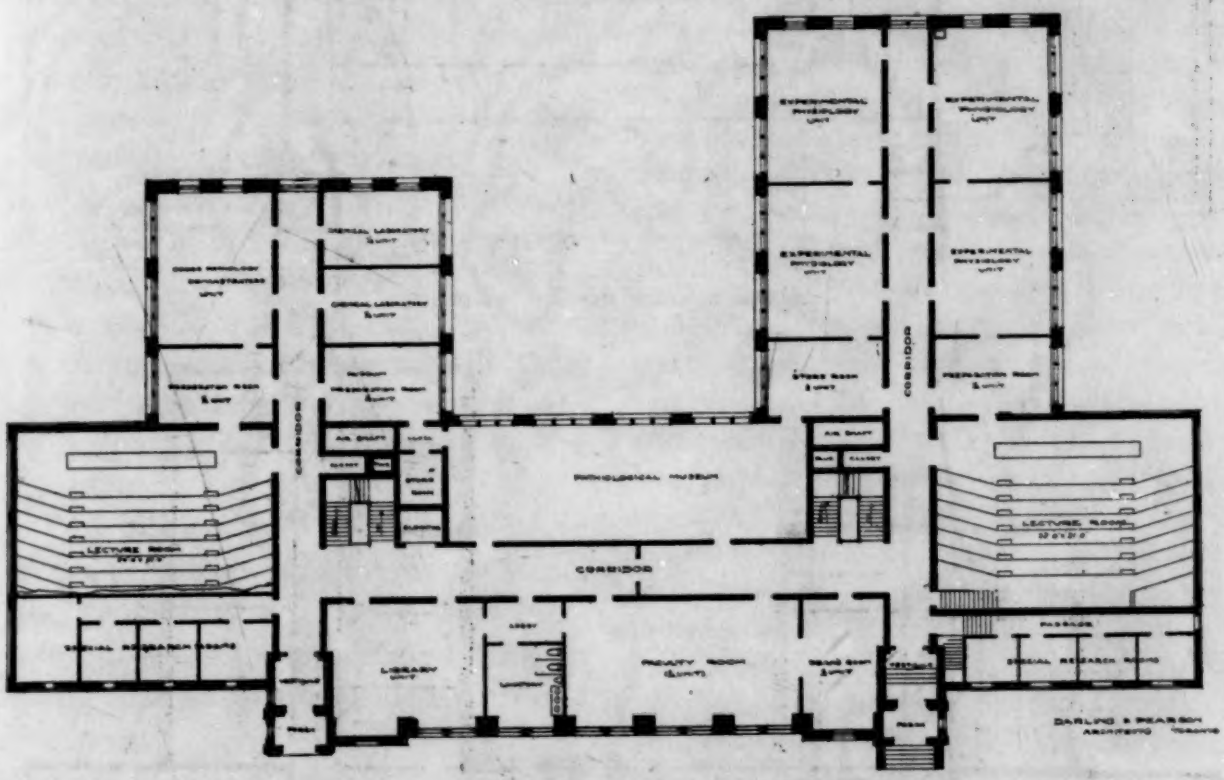


MEDICAL BUILDING TORONTO UNIVERSITY
SUB-BASEMENT

In the construction of these buildings according to the unit system special local conditions had to be considered and, further, the possibility of their extension in a few years was a factor in determining the arrangement as a whole. This necessitated important modifications in the disposition of the units as suggested in Professor Minot's later paper.

What these modifications are may be gathered from examination of the copies of the plans of the various floors of the buildings. The latter are in the form of the figure ⊔, the lecture theaters forming wing-like extensions at the angles of the figure. This latter arrangement was adopted in order to permit the lecture rooms to be lighted from their roofs, and at the same time to avoid interfering with the light for the units. An additional advantage resulted from the arrangement in that the corridors, which are centrally placed, permit ready access to the lecture theaters and units from the entrances and from the students' quarters.

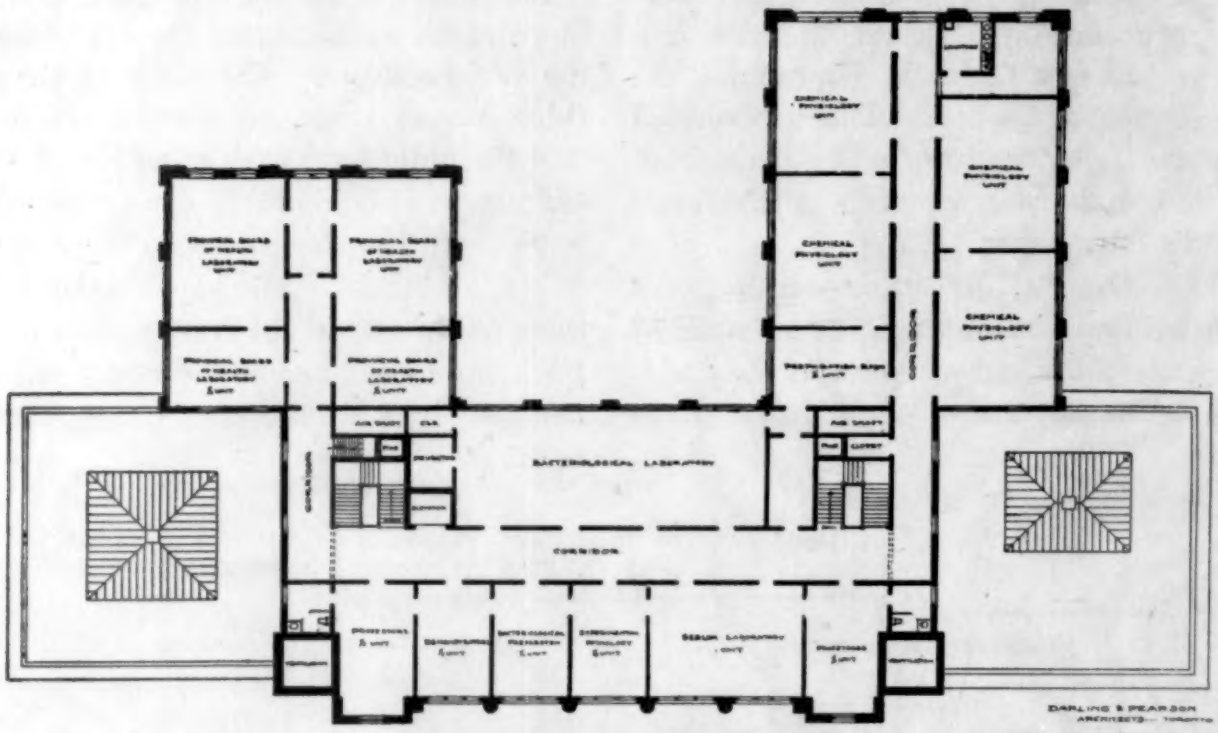
The units are, for the most part, grouped in pairs on each side of the corridors on the various floors. The walls of the corridors are of brick, but those which separate the units from each other are of wood and plaster only, and they can consequently be removed in a few hours without leaving traces of their disturbance other than those on the line of the fresh plaster added. Each unit communicates directly with its neighbor by a door, and, further, has two doors opening into the corridors. It is thus possible at any time to form two rooms out of a unit, each of which will communicate directly with the corridor.



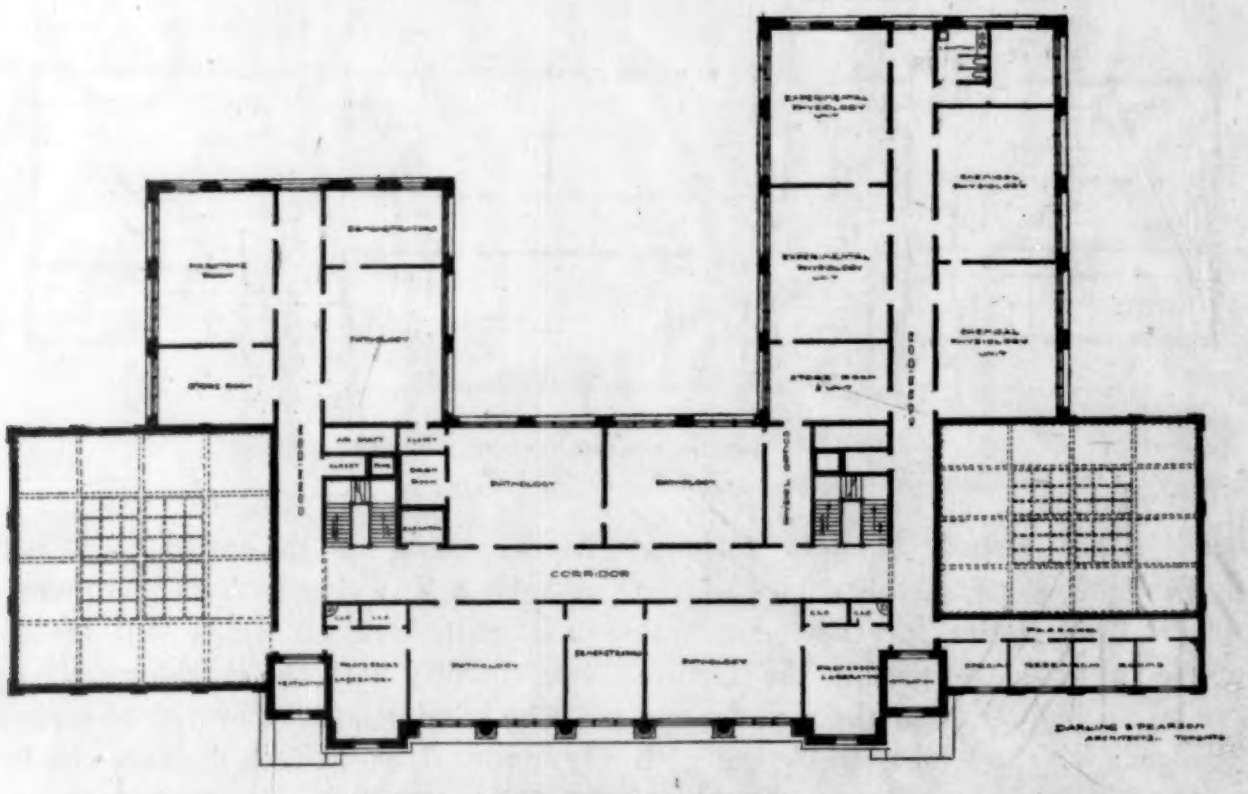
MEDICAL BUILDING TORONTO UNIVERSITY
GROUND FLOOR PLAN

The window space devoted to each unit is ample. It is, in fact, as large absolutely as the supporting capacity of the outer wall will safely permit. The window area is 242 square feet, while the outer wall of each unit measures 420 square feet.

The window area is, therefore, nearly three fifths that of the outer wall. The terminal units of the wings have additional window space in their second outer wall, and of course in these the lighting is brilliant. In all the other units, however, the lighting is, as already said, ample.



MEDICAL BUILDING TORONTO UNIVERSITY
SECOND FLOOR PLAN



MEDICAL BUILDING TORONTO UNIVERSITY
FIRST FLOOR PLAN

The corridors are lighted from the hall doors, from the large windows at the ends of the wings and from the wells over the

stairway. An examination of the building itself shows that this provides sufficient illumination with diffuse daylight, and even on very dull days it is enough for all except, perhaps, the main corridor extending between the two lecture theaters on the ground floor, and then resort may be had to electric lighting.

The two stairways are lighted from the roof, and are so placed as to permit the student reaching any floor directly from the basement, where the reading and writing rooms are situated. The locker rooms and lavatories, on the other hand, are in the subbasement and can only be reached from the basement corridor.

The wings are, including the basement and subbasement, five stories in height. The main portion is only three stories, if we leave out of account the boiler room. This arrangement is due to the fact that the rear part of the building is placed in a shallow ravine. White brick, with stone facings here and there, is the material; the roof is flat and bordered all round with a brick parapet.

The building is heated by air forced over heated coils by large fans driven by steam and the ventilation is thus, in part, provided for, and also by the exhaust currents in the ventilation turrets which rise over the entrances.

A feature of special interest is presented by the small research rooms. The half units are intended to be used for various purposes, but chiefly for small groups of students pursuing advanced work or for special lines of research, but each of the fifteen small rooms, shown in the plans as adjacent to the lecture theaters, is reserved for individual workers carrying on selected investigations. These, with the other arrangements described, have been designed with the view of making the buildings a home for research. A. B. MACALLUM.

SCIENTIFIC BOOKS.

A Laboratory Text-Book of Embryology. By CHARLES SEDGWICK MINOT. Philadelphia, P. Blakiston's Son & Co. 1903. Pp. 380. With 218 illustrations, chiefly original.

The past year has witnessed the publication of several manuals of embryology, among which may be mentioned: (1) The comprehensive and exhaustive 'Handbuch der vergleichenden und experimentellen Entwickelungslehre der Wirbeltiere,' edited by Dr. Oscar Hertwig, of which eleven Lieferungen have appeared to date; (2) Korschelt and Heider's 'Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thieren, allgemeiner Theil' in two parts; and (3) McMurrich's admirable 'Development of the Human Body.' The first furnishes the student with the only complete summary of the embryology of vertebrates published since Balfour's 'Comparative Embryology' appeared in 1881; in it the enormous mass of literature since that date is fully digested, and the results are presented in connected form, so that it may serve as a new starting point for the student of vertebrate embryology. In the general part of their text-book Korschelt and Heider furnish the long-promised completion of the special parts by a full treatment of the structure, origin, maturation and fertilization of the germ-cells, and the experimental embryology of invertebrates. McMurrich's book is an excellent brief treatise for the medical student of the main facts of human embryology. Minot's new book is a laboratory guide, mainly in the embryology of mammals. Thus the teacher of embryology is furnished with a fairly complete 'up-to-date' equipment of the literature in his subject for the use of his students.

Minot's laboratory text-book is written from the standpoint of the anatomist rather than of the biologist. In this point of view lie both its limitations and its excellencies. It is the outgrowth of the actual experience of one of the best known of the teachers of embryology, and hence is strongly individualized. Too much praise can not be given to the large number of new and beautifully executed

illustrations; a number of fine figures are transferred from the original sources to a text-book for the first time, and only the best of the stock illustrations of other text-books are retained. The book is, indeed, built up around the illustrations, and the text often suffers by comparison. The figures of reconstructions of the pig embryo of twelve millimeters neck-length are especially fine, as are also the figures of sections of this embryo and of other sizes. In all of these figures there is the most painstaking reproduction of details, and the accuracy of the work is equaled only by its beauty. The illustrations of the two stages of the chick embryo studied are also noteworthy for accuracy and finish.

The contents are arranged as follows: The first chapter deals with general conceptions, the second with the early development of mammals, and the third with the most general development of the human embryo. These chapters are introductory in their scope, without practical directions. The following chapters are practical; the fourth deals with pig embryos: beginning with the embryo of 12 mm., there follow in order, embryos of 9 mm., 6 mm., 17 mm. and 20 mm. The fifth chapter is a study of two stages of the embryo chick, with twenty-four somites, and with seven somites. In chapter six we have a study of the blastodermic vesicle of mammalia and of the segmentation of the ovum. Chapter seven deals with the uterus and the fœtal appendages of man, and chapter eight with methods.

Thus it will be observed that the student is led from a 12-mm. pig to a 9-mm. and 6-mm. stage, then by jumps to 20-mm.; from here a broad leap takes him to the youngest embryo yet studied, the chick of twenty-four somites, and he continues to descend by way of earlier stages of the rabbit, to the unsegmented ovum. This may fairly be termed *inverted embryology*. Professor Minot will not claim that this inverted order is logical, but only that is practical. It is a question of the pedagogy of embryology. Now it is safe to admit, that, for an anatomist who knows nothing of biology, the inverted method of studying embryology is likely to be the more comprehensible; and as most of our medical students are (crude) anatomists of this sort, it may be that their journey to embryological knowledge would subject them to fewer intellectual jolts if made by this road. It certainly is the historical highway by which the fathers of this science traveled; if recapitulation be the law in embryonic development, why not in embryological pedagogics?

It seems to me, however, to be an unwise concession to the present imperfect preparation of our medical students, and, in all seriousness, I believe an unnecessary concession; for my experience is that, after the first shock of exposure to biological conception and ideas, the medical student readily follows the cœnogenetic and logical method of proceeding upwards from the ovum. Moreover, the time is not far distant when every medical student will be required to have mastered the rudiments of biology before he shall be admitted to the study of that branch of applied biology known as medicine. With such a preparation the logical method is much better.

It is not, however, incumbent on the user to follow the order of the book, for the description of each stage is complete in itself. Those who use it, therefore, will probably follow their own ideas of order; and the practical parts can be unhesitatingly recommended as excellent in themselves.

The chapter on methods is rather brief, but good as far as it goes; a larger number of formulæ of killing fluids and stains and the methods of using them would undoubtedly be an improvement.

The three general introductory chapters are best, as is to be anticipated, in the parts allied to the author's own province of work; thus the 'law of genetic restriction' is well expressed and discussed; and the third chapter on the human embryo is by far the best brief outline of human development known to me. On the other hand, the unfortunate student who might have to derive his ideas on karyokinesis and on the maturation of the ovum from the vague accounts of this book, would probably conclude, for his own peace of mind, that these subjects are not of much importance after all. As regards the germ-layers in mammals we read on p. 59 that 'it is probable that

the subzonal layer is the ectoderm and that the inner mass is the entoderm,' whereas it is well established that the subzonal layer forms the ectoderm of the chorion (possibly also its mesoderm in some forms) only, and that the inner mass forms all of the tissues of the embryo proper as well as the yolk-sac. The mesoderm is described as arising by a process of delamination in birds, reptiles, elasmobranchs and mammals: 'It is safe to say that the mesoderm probably arises by this process, which we call delamination in all vertebrates' (p. 74). It would be difficult to make a more misleading statement concerning the origin of the mesoderm in vertebrates. The necessity for condensation affords no excuse, as the admirably clear, accurate and brief statement on the same subject in McMurrich's new manual demonstrates.

Such sweeping statements as the two following are at least regrettable: 'It is fortunate for our comprehension of embryological processes that we are already able to say that Roux's hypothesis is erroneous,' referring to the mosaic theory of the segmented ovum; we know, as a matter of *fact*, that certain ova (*e. g.*, of *Ctenophores*) are true mosaics; and the general bearing of recent embryological results is that all ova are more or less mosaic, in an unstable fashion. On page 41 we are told that Weismann's hypotheses are 'complicated' and 'useless'; not to mention the stimulus they have given to research, this sounds strange on the eve of a general rehabilitation of such hypotheses in connection with Mendel's laws of inheritance.

The book contains too many bad misprints and similar errors; *e. g.*, page 19: 'In mammals there are always four pairs (of gill pouches) *on each side*'; page 29, 'latter' for 'former' in the second line of the last paragraph; page 63, first line, Fig. 23 does not show the structure referred to; page 63, another erroneous figure reference in the second sentence of the last paragraph; page 91 'ectoderm' for 'entoderm' middle of page; page 105, 'unguiculate' for 'ungulate,' last sentence of third paragraph; page 113, 'three months' for 'three weeks,' second line from bottom of first paragraph. These are only a few instances of many.

Finally a protest should be entered against the use of the German word 'Anlage' to denote 'rudiment,' and especially against such a hybrid monstrosity as 'deck-plate' for 'roof-plate,' the first component being German and the second English. FRANK R. LILLIE.

Handbook of Climatology. Part I., *General Climatology.* By Dr. JULIUS HANN, Professor of Cosmical Physics in the University of Vienna. Translated by ROBERT DECOURCY WARD, Assistant Professor of Climatology in Harvard University. New York and London, The Macmillan Co.

English readers interested in the climate of the earth will welcome the translation of the most important portion of the 'Handbuch der Klimatologie' by Dr. Hann, who now by general consent is accepted as the leading authority on this matter in the world. But the new English edition is more than a translation, and it would have been clearer had the title read translated and revised. Professor Ward has taken great pains to bring all the matter down to date. Besides his own large reading on the subject he has consulted such experts as Professor F. W. Very, Professor W. M. Davis and Professor R. W. Wilson, and then referred all criticism and suggested changes or additions to Dr. Hann, who has passed upon them or revised them, and thus given the weight of his authority to the matter, so that the book becomes essentially a revised edition including more American examples than the original. The preface says that, "Most of the examples given, however, necessarily still relate to Europe, because the climatology of that continent has been studied more critically than that of any other region. A few cuts have been made where the discussion concerned matters of special interest to European students only. Most of the paragraph headings are new, and the arrangement of parts, sections and chapters is somewhat different from that in the original. These changes have been made with a view to adapting the book better for use in the class-room. Every change that has been made has the full

approval of Professor Hann, who has been consulted in regard to all of these matters. Every reference, the original of which is accessible in the Harvard College library or in the library of the Harvard College Observatory, has been looked up, verified and made as complete as possible. No apology is needed for the use of the Centigrade and metric system in such a book as this. For convenience, conversion tables, reprinted from the Smithsonian Meteorological Tables, are given in the appendix."

Professor Ward has also taken great pains to have the book rendered into good English, and in this matter he has had the skilled hand of Professor Henry S. Mackintosh to assist him.

He has also taken great pains to add new references; and the book is remarkably rich as a bibliography to modern literature on climatology.

The book is divided into two parts. Part I. deals with the 'Climatic Factors,' namely, temperature, moisture, cloudiness, precipitation, winds, pressure, evaporation, composition of the atmosphere and phenological observations. Part II. deals with solar or mathematical climate, physical climate, the influence of land and water on the distribution of temperature, the influence of continents upon humidity, cloudiness, precipitation and winds, the influence of ocean currents upon climate, the influence of forests on climate, the mean temperature of parallels of latitude and of the hemispheres, mountain climate, and finally geologic and periodic changes of climate.

No less than five chapters are devoted to mountain climate and the influences of mountains on climate.

No one familiar with Dr. Hann's writings need be told that he deals with the subject from a cosmopolitan standpoint which is rare even among the leaders in science, and he shows a surprising familiarity with the literature of every language. The translation seems all that one could wish.

H. H. Clayton.

SCIENTIFIC JOURNALS AND ARTICLES.

The *Journal of Comparative Neurology* for April contains the following articles: 'The Fore-Brain of *Macacus*,' by Wm. Wolfe Lesem, a study of the superficial anatomy of the brain of the macaque monkey, with two plates. 'Brain Weights of Animals, with Special Reference to the Weight of the Brain in the Macaque Monkey,' by Edward Anthony Spitzka, including a tabulation of the brain and body weights of 204 specimens of mammalian brains. 'A Description of Charts showing the Areas of the Cross-sections of the Human Spinal Cord at the Level of each Spinal Nerve,' by Henry H. Donaldson and David J. Davis, an entirely new computation, including a comparison of the young and mature spinal cord and six different sets of curves. 'The Brain of the Archæoseti,' by G. Elliot Smith, a description of two casts of the brain cavity of this extinct cetacean, with four figures. There are twenty pages of book reviews, including a full summary of the researches of Professor Elliot Smith on the 'Phylogeny of the Pallium.'

SOCIETIES AND ACADEMIES.

ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

The work of the society for the winter has maintained the high level of former years, as shown by the importance of the papers presented and the enthusiasm displayed. At the meeting of November 4, 1902, Professor Lester F. Ward discussed 'Race Differentiation and Race Integration,' treating the subject from the social side, and in this connection Professor Holmes showed diagrammatically the beginnings of races and their final amalgamation.

Professor W. H. Holmes followed with a paper entitled 'The Search for Glacial Man,' reviewing the various discoveries and describing the recent find of human remains at Lansing, Kansas. The meeting of November 4 was devoted to sociology, and papers were read by Mr. Charles F. Weller, on 'How Citizenship is Molded in Washington Alleys and Shacks,' and by Dr. George M. Kober, on 'The Abuse of Medical Charities.' These

papers set forth in an interesting manner the efforts being made to promote good citizenship. On December 2 Dr. D. S. Lamb read a paper on Rudolph Virchow, Miss Harriet A. Boyd gave a résumé of the important discoveries of the past few years in Crete, and Professor Holmes presented examples of Central American sculpture.

The twenty-fourth annual meeting was held on January 6, 1903, and the following officers were elected:

President—Miss Alice C. Fletcher.
General Secretary—Walter Hough.
Treasurer—P. B. Pierce.
Councilors—Dr. G. M. Kober, Dr. D. S. Lamb and F. W. Hodge.

At the following meeting of the board of managers there were elected:

Secretary to the Board—J. D. McGuire.
Curator—Mrs. Marianna P. Seaman.
Councilors—Hannah L. Bartlett, J. Walter Fewkes, Weston Flint, J. W. B. Hewitt, J. H. McCormick, J. D. McGuire, J. R. Swanton and Edith C. Wescott.
Vice-Presidents of the Sections—D. S. Lamb, Frank Baker, W. H. Holmes, J. Walter Fewkes, George M. Kober, W J McGee and Lester F. Ward.

At the meeting of January 20 a paper was read by J. Dyneley Prince and Mr. Frank Speck, on 'The Modern Pequots and their Language,' which was discussed by Dr. A. S. Gatschet, who remarked that this paper contains almost all we know about the vanishing Pequots. The general secretary read a paper entitled 'The Gypsy,' which brought out general discussion.

At the meeting of February 3, the retiring president, W. H. Holmes, delivered his annual address under the auspices of the Washington Academy of Sciences, the subject being 'A Genetic View of Man and Culture.' The scope of the science of anthropology was defined and the limitations and relations of its various branches considered. By means of diagrams, the genetic relations of the various groups of physical, mental and cultural phenomena were indicated, and the methods of research in the various fields and the manner of applying the knowledge acquired to the elucidation of human history were discussed.

At the meeting of February 17 Dr. John R. Swanton's paper on 'The Religion of the Haida Indians' gave voluminous information on a subject almost entirely untouched, heretofore. The second paper, by Mr. C. A. Simms, described a wheel-shaped monument discovered by him in Wyoming.

At the meeting of March 4, under the head of varieties, Dr. G. M. Kober read an extract from *American Medicine* on 'Hereditary Pauperism'; Professor Holmes gave details as to the new museum building; the president, Miss Fletcher, read a letter from Dr. G. G. MacCurdy in response to an inquiry concerning the course of anthropology at Yale, and remarked on Dr. Codrington's observations on the stability of unwritten language based on the Solomon Islanders, whose vocabulary has had no change in 300 years; she also announced the death of Mrs. Mary L. D. Putnam, of Davenport, Iowa.

Professor L. F. Ward followed with a paper on 'The Cross-fertilization of Cultures.' He dealt with origins, tracing the course of two or several independent human nuclei up to the point of meeting and contact, which, according to circumstances, determined peaceful or warlike races. He traced the origin of the state through militancy by various stages until conquerors and conquered are united under a war chieftain who is depended on, thus giving stability. Then races mix on the line of contact between the conquerors and conquered, forming a people, and we have cross-fertilization of races. In discussion, Professor Holmes said that we can now almost safely go back along the lines marked out by Professor Ward and depict pre-man.

In the next paper, by Dr. J. H. McCormick, on 'Prehistoric Remains of Mobile Bay,' the ancient mounds and sites of historic interest in the locality were described.

At the meeting of March 17 the president read a communication from Mr. Hill Tout, giving the aims of the Ethnographic Survey of Canada, of which he is secretary, and commented on the plan.

Professor M. D. Learned, of the University of Pennsylvania, read a paper entitled 'An Ethnological Survey of the United States.' Professor Learned noticed the efforts of the Germans, English and Americans in this matter, and announced that a bill for an ethnographic survey of Pennsylvania is pending in Harrisburg. This bill grew out of a test survey called the Conestoga Expedition of 1902, through which a great mass of valuable material was gathered. Professor Learned said that the character of the investigation should be a culture census of the American people, and agreed that, owing to the magnitude of the task, it should be undertaken by the census office. The paper was discussed by W. H. Babcock, Dr. H. C. Bolton, George R. Stetson, Professor Alexander G. Bell, Mrs. M. C. Stevenson, Dr. D. S. Lamb and E. S. Hallock.

The paper by Dr. I. M. Casanowicz, entitled 'Græco-Roman Papyri in the United States National Museum,' described the making of paper from the papyrus reed, the size of the books in the collection, their character as accounts, ledgers, letters, etc. Translations of a number of these Fayum papyri were given.

At the meeting of March 31 the president announced that Professor Brigham, of Honolulu, had succeeded in taking phonographic records of the intoned 'olas' or sagas of the Hawaiians, from the few old men who preserved these sacred chants.

The paper of the evening, 'Indian Baskets: What they are and What they mean,' was presented by Dr. C. Hart Merriam. The subject was illustrated with numerous specimens from Dr. Merriam's large collection and by many lantern slides. It was pointed out that the basket-making tribes to-day are confined to the regions west of the Rocky Mountains. The materials, the forms and uses of baskets, the environment, the state of the art and other topics were discussed and the patterns, so far as they have been determined, were explained. Dr. Merriam said that he had found the butterfly pattern in use among widely separated tribes, who give it the same meaning.

Walter Hough,
Secretary.

American Mathematical Society.

A regular meeting of the American Mathematical Society was held at Columbia University, Saturday, April 25. About fifty persons, including forty members of the society, attended the two sessions. The president of the society, Professor Thomas Scott Fiske, occupied the chair. The following new members were elected: Professor William N. Ferrin, Pacific University, Forest Grove, Ore.; Mr. Ernest H. Koch, Jr., Mackenzie School, Dobbs Ferry, N. Y.; Professor Norman C. Riggs, Armour Institute of Technology, Chicago, Ill.; Mr. K. D. Swartzel, Harvard University. Twelve applications for membership were received.

Sectional meetings of the society were held at Northwestern University, April 11, and at Stanford University, April 25. Reports of these meetings will appear separately in Science.

The university subscriptions in support of the *Transactions* which have expired have been renewed, except that Wesleyan University now takes the place of Princeton in the list of supporting institutions.

While the activities of the society are concentrated on the promotion of mathematics as a science, it is inevitable that through its large and representative membership it should ultimately exert a considerable and beneficial influence on the teaching of mathematics in schools and colleges. As a scientific body, the society does not promulgate official views on any subject, but merely furnishes a forum for discussion. That it does not endorse any particular conclusion is not, however, by any means inconsistent with the collection and digestion of useful information. At present three several committees of the society are actively engaged in the preparation of reports on requirements in mathematics for the master's degree, on college entrance requirements in mathematics, and on desirable relations of the society to the teaching of elementary mathematics, respectively. The society has recently been greatly interested in a movement, foreshadowed in Professor E. H. Moore's presidential address (*vide* Science, current

volume, pp. 401–416), which is taking effective shape in the organization of associations of teachers of mathematics throughout the country. On April 11–12 the Central Association of Teachers of Mathematics and Science was formed at Chicago, Professor Moore and other members of the society actively cooperating. At a meeting held in Boston on April 18 the Association of Teachers of Mathematics in New England was organized. This meeting was opened by an address, by President Thomas S. Fiske of the society, on 'Methods for improving the teaching of mathematics.' Other similar associations will probably soon be formed. It is precisely through such associations that the society can best exert a real influence on the teaching of mathematics.

The following papers were read at the April meeting:

H. E. HAWKES: 'On non-quaternion number systems in seven units.'

B. O. PEIRCE: 'On families of curves which are the lines of certain plane vectors, either solenoidal or lamellar.'

E. W. BROWN: 'On the variation of the arbitrary and given constants in dynamical equations.'

L. P. EISENHART: 'Congruences of tangents to a surface, and derived congruences.'

H. F. STECKER: 'Least distance in the non-euclidean plane.'

L. E. DICKSON: 'Fields whose elements are linear differential equations.'

SAUL EPSTEEN: 'On linear differential congruences.'

R. S. WOODWARD: 'The deviation from the vertical of falling bodies.'

EDWARD KASNER: 'The automorphic groups of the manifolds defined by a general and a symmetric determinant.'

C. H. SISAM: 'On some directrix curves on quintic scrolls.'

L. I. NEIKIRK: 'Groups of order p^m which contain cyclic subgroups of order p^{m-3}.'

I. M. SCHOTTENFELS: 'On the simple groups of order 8!/2.'

E. B. WILSON: 'The so-called foundations of geometry.'

The American Physical Society was in session simultaneously with the Mathematical Society. While it was found impracticable to arrange a joint session, several members of the Physical Society attended the presentation of Professor R. S. Woodward's paper. In the evening twenty-five members of the two societies dined together and continued the discussion of the outlook for the better teaching of mathematics, a topic of mutual interest and importance.

The next meeting of the Mathematical Society will be the summer meeting, which, with the Fourth Colloquium, will be held at the Massachusetts Institute of Technology, Boston, beginning August 31. F. N. COLE,

Secretary.

DISCUSSION AND CORRESPONDENCE.

THE PROPOSED BIOLOGICAL LABORATORY AT THE TORTUGAS.

THE need of a first-class marine laboratory for research in the tropical Atlantic is so apparent and so pressing that I hope that no apology is necessary for a few practical suggestions that are the result of a personal acquaintance with the station that seems, from the replies to Dr. Mayer's enquiries, to be the one most favored by the zoologists who have been consulted. Without any intention of belittling the claims of any other situation, there are certain important advantages that can be urged in favor of the Tortugas that seem to render this station far and away the most advantageous for the best work along marine biological lines. These may be summarized as follows:

1. The unexcelled fauna. It seems to me that there is hardly a doubt that at no point in the vicinity of our southern coast are the conditions more favorable for profuse marine life than here. Some years ago an expedition from the University of Iowa examined with some care several regions in the West Indies and Florida keys, including the island of Eleuthera, Cuba, Key West and the Tortugas. While any one of these stations would afford abundant material for investigation, the preeminence can confidently be claimed for the last of these points. As asserted by Dr. Mayer, the northern edge of the Gulf Stream seems to very materially excel the southern, especially in the matter of pelagic life.

The extensive reefs and flats abound in almost all groups of marine invertebrates that belong to the West Indian fauna, and are easily accessible from Garden Key, where the proposed station would logically be placed.

2. The unusual purity of the water. This is a condition that will appeal to any one who has had much experience with marine work. There being no city or even town in the immediate neighborhood is a decided advantage from this standpoint. Even at Naples, which is now probably the best station in the world, there are many forms that are not successfully kept for any length of time in the aquaria. When the writer was at Plymouth, England, some years ago, the water, although apparently pure, was the cause of much perplexity and discouragement. At the Woods Hole laboratories the condition is even worse, and many problems have to be abandoned that could be solved with the aid of such water as could easily be secured at the Tortugas. While it may be claimed that equally pure water could be obtained at other points in the West Indies, I know of no place where it would be so easily introduced into a laboratory. The ship channel runs right by the old quarantine station on Garden Key, and practically no piping would be necessary to utilize it for laboratory purposes.

3. By far the largest and best stocked aquarium in the world is already established there in the form of the old moat that was of course originally designed to serve quite different purposes. This moat is protected by a solid wall of masonry that at the time of our visit was practically intact and good to serve for many years. The opposite side of the moat is the solid wall of old Fort Jefferson. I do not remember the width of the moat, but it must be at least thirty yards, judging from a photograph taken by myself. It is from three to six feet deep, the water is changed at every tide, and its surface is always quiet, except when an unusually heavy storm throws the spray over the outer wall. Here are conditions such as can nowhere else be found. During nearly half a century this moat has been practically undisturbed by man, and has been populated with an extremely rich fauna of its own. Here many species of marine animals and plants can be watched daily and hourly, if need be, throughout their lives, and under perfectly natural conditions. Portions of the moat could easily be divided off for particular purposes by the use of wire screens. The breeding and development of many species could be carried on under scientific control, and the results would not be vitiated by the objections so constantly raised concerning the unnatural conditions of many of the present laboratory experiments.

4. Nearness to the Pourtales Plateau. This submarine shelf made famous by the wonderful results of the dredging done by the *Blake* and other vessels lies within easy reach of the Tortugas. This would give an excellent opportunity to investigate forms of a comparatively deep-water zone in a region probably unexcelled in richness of fauna by any other in the western hemisphere.

It is improbable that deep-water work is contemplated by those having charge of the movement for a laboratory in this region, but there is no reason why excellent work should not be done in this direction. We were perfectly successful in dredging on the plateau with a small schooner, with iron rope and an ordinary windlass worked by hand power. Indeed, it was here that we met with our best success.

5. An abundance of building material. This is already on the spot and could doubtless be secured for scientific purposes without any cost whatever. Fort Jefferson was originally one of the most extensive fortifications in the United States, but it is now crumbling into ruins. Some parts of the buildings could doubtless be repaired at little cost to serve the purposes of the station, and there are millions of brick and quantities of stone that are serving no purpose whatever. I understand that all this is now in the hands of the U. S. Army, but it could surely be secured for such a purpose as is contemplated if the matter were fairly presented to the proper authorities.

Another very important matter in this connection is the large supply of excellent drinking water stored away in the immense cis-

terns, originally intended to serve for a supply for thousands of men. Any one who has worked in tropical regions will appreciate what it means to have abundant fresh water that is good and sweet and cool. This, together with the absence of mosquitoes, would be a very forceful argument in favor of the Tortugas with naturalists of experience in warm regions.

Of course it is possible that some of the conditions have changed since the writer visited the Tortugas. For instance, the moat may have become partly filled up, or the channel may have changed so as to block the way to the old quarantine building. But it does not seem likely that conditions are greatly different from those described above, or that the changes are such as materially to modify the advantages of that locality for a marine biological laboratory. It has been my purpose to mention particularly certain advantages that would not occur to one not acquainted with the local situation, and it appears to me that these considerations are of unusual weight in the present case.

Taking into consideration the whole body of American workers that could use such a station to advantage, it can hardly be said that the Tortugas are less accessible than the other localities suggested in the letters published by Dr. Mayer, *i. e.*, the Bermudas or Jamaica. For those living in the central or western states the Tortugas are more accessible than either of these. Of course if a station were established at the Tortugas, it should possess its own means of transferring workers and supplies to the mainland.

C. C. NUTTING.

STATE UNIVERSITY OF IOWA,
May 2, 1903.

I AM asked whether I approve or disapprove of the plan to establish a marine biological laboratory for research in the tropical Atlantic. Considered solely with reference to the good of science, it is impossible to see how any biologist could disapprove such a plan. Thus viewed, the only room for discussion would seem to be as to what the aims of such a laboratory should be. But even here it seems to me there should be little hesitation, so far, at least, as generalities are concerned. The proposed laboratory should, of course, aim to provide facilities for any investigator, at any time, to carry on any investigation for which the opportunities furnished by nature should be good. This general purpose requires no advocating, since it is essentially one that has been held by most, if not all, American marine laboratories, and hence would probably be foremost with this.

What does need urging, it seems to me, is that this new laboratory should not limit itself to this purpose. In addition to its being a laboratory where anybody can do any kind of work in which he may be interested, let it have an aim of its own, as a laboratory. Let it set for itself the task of investigating the sum total of the life and the life conditions of the area in which it shall be located. Let it undertake a biological survey of the region. This will require organized, continuous and long-continued effort.

In no American seas is there being biological work done in any way comparable with what, for example, Scandinavian and German naturalists are doing in the North and Baltic seas, and the Liverpool biological committee is doing in the Irish sea. Yet whether regarded from the strictly scientific point of view, or from the point of view of the economic interests of marine life, few aspects of biology promise surer and more important results than do investigations of this sort.

The work done by our seaside laboratories has been altogether too narrow, and the foundation of a new one in the tropical Atlantic would be a peculiarly favorable opportunity to broaden out. WM. E. RITTER.

UNIVERSITY OF CALIFORNIA,
May 3, 1903.

TO THE EDITOR OF SCIENCE: The plan to establish a marine biological laboratory in the tropical Atlantic is one of which I am heartily in favor.

Although I have never visited the Tortugas, I have received many interesting collections from there and appreciate their wealth of characteristic coral-reef fauna. At some

future time, a comparison of the fauna of this region with that of the life of similar reefs in Samoa or Tahiti would be highly instructive.

Surely there can be no place on our Atlantic coast which would give handsomer returns for such an outlay. The only objection is the relative inaccessibility of the Tortugas.

David S. Jordan.

SHORTER ARTICLES.

SOME LITTLE-KNOWN BASKET MATERIALS.

Basket collectors have been much puzzled over the identity of two materials which are extensively used by some of the California tribes. One of these forms the body surface of most of the coiled baskets made by the Indians inhabiting the lower slopes of the Sierra from Fresno River south to the Kern. These baskets are celebrated for excellence of workmanship, beauty of form, elegance of design and richness of material. The material differs in tone and texture from that used by the tribes north and south of the region indicated. When fresh its color is brownish-buff; with age it becomes darker and richer. By careful selection a handsome dappled effect is produced. The Indians told me it was the root of a marsh plant which they traveled long distances to procure. After some difficulty I succeeded in obtaining specimens, which were identified for me by Miss Alice Eastwood, botanist of the California Academy of Sciences, as *Cladium mariscus.* The coil, around which the split *Cladium* root is wound, consists of a bundle of stems of a yellow grass, *Epicampes rigens.* The black in the design is the beautiful root of the 'bracken' or 'brake fern,' *Pteridium aquilinum.* The red is usually split branches of the redbud, *Cercis occidentalis,* with the bark on, gathered after the fall rains when the bark is red. The tribes making the *Cladium* baskets are the Nims, Chukchancys, Cocahebas, Wuksaches, Wiktchumnes, Tulares and perhaps one or two others. Besides these, the root is sometimes used by certain squaws of the Mewah tribe living north of the Fresno, and by the Pakanepull and Newooah tribes living south of the Kern; but among these its use is exceptional.

Another material which has proved a stumbling block to collectors is the red of the design in the handsome baskets made by the Kern Valley, Neewooah, and Panamint Shoshone Indians. This material is often called 'cactus root,' but in my recent field work in the region where it is used I discovered that it is the unpeeled root of the tree yucca (*Yucca arborescens*). The tree yucca grows in the higher parts of the Mohave Desert, pushes over Walker Pass, and reaches down into the upper part of the valley of South Fork of Kern. The so-called Tejon Indians obtain it in Antelope Valley at the extreme west end of the Mohave Desert. The yucca root varies considerably in depth of color, so that by careful selection some of the Indian women produce beautiful shaded effects and definite pattern contrasts.

Some of the Panamint Shoshones inhabiting the desolate desert region between Owens Lake and Death Valley use, either in combination with the yucca root or independently, the bright red shafts of the wing and tail feathers of a woodpecker—the red-shafted flicker. These same Indians use two widely different materials for their black designs—the split seed pods of the devil's horn, *Martynia,* and the root of a marsh bulrush, *Scirpus.* The *Martynia* is a relatively coarse material and when properly selected yields a dead black. The *Scirpus* root is a fine delicate material which, by burying in wet ashes, is made to assume several shades or tones, from blackish-brown to purplish-black, or even lustrous black.

In parts of the Colorado Desert in southeastern California the Coahuila Indians use split strands from the leaf of the desert palm (*Neowashingtonia filamentosa*) as a surface material for their coiled baskets. The design is usually black or orange-brown and is a rush (*Juncus*).

C. Hart Merriam.

A NOTE ON PHRYNOSOMA.

In 'The Cambridge Natural History,' Vol. VIII., on 'Amphibia and Reptiles,' by Hans Gadow (London, 1901), on p. 533, regarding

the genus *Phrynosoma*, the author says, 'All the species are viviparous, almost the only instance among Iguanidæ.'

This statement, which is as given in the older works on reptiles, does not apply to *Phrynosoma cornutum* of Texas, as I showed in my 'Notes on the Biology of *Phrynosoma cornutum* Harlan' in the *Zoologischer Anzeiger*, No. 498, 1896 (also SCIENCE, N. S., Vol. III., No. 73, pp. 763–5). In that paper I described the nest building and ovulation for the above species.

As pointed out by R. W. Shufeldt in SCIENCE, September 4, 1885, pp. 185–6, and later SCIENCE, N. S., Vol. III., No. 76, pp. 867–8, June 12, 1896, *Phrynosoma douglassii* is viviparous, so that the genus *Phrynosoma* contains both oviparous and viviparous species.

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A NOTE ON NOMENCLATURE.

Festuca spicata Pursh. Fl. Am. Sept. 83. 1814.

Agropyron divergens Nees in Steud. Syn. Pl. Glum. 347. 1855.

A. spicatum Rydb. Mem. N. Y. Bot. Gard. 1: 61. 1900 (Cat. Fl. Montana).

Agropyron glaucum occidentale Scribn. Trans. Kan. Acad. Sci. 9: 119. 1885.

Agropyron spicatum Scribn. & Smith, Bull. U. S. Dept. Agric. Div. Agrost. 4: 33. 1897.

Agropyron Smithii Rydb. Mem. N. Y. Bot. Gard. 1: 64. 1900 (Cat. Fl. Montana).

Agropyron occidentale Scribn. U. S. Dept. Agric. Div. Agrost. Circ. 27: 9. 1900.

Festuca spicata Pursh.

"F. spiculis alternis sessilibus erectis subquinquefloris, floribus subulatis glabriusculis, aristis longis scabris, foliis linearibus culmoque glabris.

"On the waters of Missouri and Columbia rivers. June. v. s. in Herb. Lewis."

Steudel published '*Triticum divergens* Nees. (mpt. sub. *Agropyrum*)' based on a plant collected by Douglas. This is the common wheat grass of the Northwest, usually with long-awned spikelets.

Another common species of the Great Plains, often called blue joint or blue stem, had for years been identified with *A. repens* Beauv. or *A. glaucum* R. & S. of Europe. In 1885 Professor Scribner made this a variety (*occidentale*) of the latter European species. Twelve years later Scribner and Smith, in their review of the genus *Agropyron*, raised this to specific rank, but with the name *A. spicatum*, as they believed it to be the same as Pursh's *Festuca spicata*.

Mr. Rydberg, having examined Lewis's specimen in the Herbarium of the Philadelphia Academy, decides that *Festuca spicata* Pursh is identical with *Agropyron divergens* Nees and, following the Rochester Code, renames the plant *A. spicatum* Rydb. But there was already the *A. spicatum* S. & S., which must receive a new name, *A. Smithii* Rydb. Then Professor Scribner calls attention to the earlier varietal name *occidentale*, which must be taken up, and we have *A. occidentale* Scribn., or more consistently, if the parenthesis is used in citations, *A. occidentale* (Scribn.) Scribn.

If a later botanist examines the type and decides that it is *A. Vaseyi* Scribn. & Smith or some other species, another change must ensue. It seems to be a case of he laughs best who laughs last.

The object of reciting this piece of nomenclatorial history, which might be duplicated many times, is to point out the mischief which arises from allowing a specific name to have priority over a binomial. I am not sure that the Rochester Code compels this, but it seems to have been so interpreted by many botanists.

Rule 3, as given in Britton and Brown's 'Illustrated Flora,' states that: 'In the transfer of a species to a genus other than the one under which it was first published, the original specific name is to be retained.' This is unequivocal, as no exceptions are made. Rule 5 seems to prohibit the use of *Agropyron spicatum* for any species later than that to which it was first applied. (Rule 5: 'The publication of a generic name or binomial invalidates the use of the same name for any

subsequently published genus or species, respectively.')

It may be that the 'subsequently published species' refers to the application of an original specific name and not a binomial. But Rule 7 says: 'Publication of a species consists only * * * (2) in the publishing of a binomial, with reference to a previously published species as a type.'

While it is not my object here to advocate any particular set of rules, but only to point out the way these rules work in practice, I would observe that in the above case:

1. The use of the original specific name, when the identity of *Festuca spicata* Pursh is discovered, gives us two new names, *Agropyron spicatum* Rydb. and *A. Smithii* Rydb. This must always occur when the displaced binomial has no earlier synonym, and even when there is an earlier available name there results a change of names.

2. If a binomial has precedence over the specific name, that is, if in transferring a species to a different genus, the earliest specific name is used except where this specific name already occurs, there is not more than one new binomial. In the case under consideration, as there is already an *Agropyron spicatum* S. & S., if *Festuca spicata* Pursh is transferred to the genus *Agropyron*, it would ordinarily be given a new binomial, but as the name *A. divergens* Nees has been applied to the same species, no new binomial is necessary.

3. If the earliest specific name which the plant has received in a given genus is used, the so-called Kew rule, no subsequent changes are necessary, so long as the plant is assigned to this genus. Subsequent investigations regarding earlier names under other genera may add to our knowledge, but will not alter the binomials. From the standpoint of stability the maximum would appear to result from following the third method.

A. S. Hitchcock.

REMAINS OF ELEPHANTS IN WYOMING.

I am not aware that any elephant remains have ever been reported from Wyoming, and for this reason wish to make a record of the following notes: During the fall of 1894 Mrs. Dover, of Dover P. O., Albany Co., discovered the lower jaw of a very small elephant in Halleck cañon, which is about forty-five miles north and east of Laramie. The fossil was covered with a thin coating of earth in the valley wash, and not petrified. It was badly taken up, and by the time it reached me was very fragmentary. The front of the jaw has been well preserved and the right molar is nearly complete. The jaw and teeth are exceptionally small and probably indicate a new species. It is interesting to note that this specimen was found at an elevation of about 6,500 feet above the sea. The remains have been donated to the university, and in due time will be described.

Three years ago, while at work in the Goshen Hole region, I found an elephant's tusk that had been cut in two by a cattle trail that was not over a foot in depth. The tusk was over six inches in diameter. No doubt there is more or less of an animal at this place; but no attempt has been made to unearth it.

While at Casper a few years ago a stockman described a tooth which one of his riders had brought into his ranch, and which he had sent east as a present to a friend. From his description it must have been a very large tooth of an elephant. While this datum has little if any value, yet it is quite certain that an animal or a portion of an animal was found in that region.

To this I wish to add another note, which, although not in connection with Wyoming data, adds some important information to this subject. Two years ago, while at work near Fossil, a collector brought to me a beautiful elephant's tooth of unusual size. He informed me that he had taken it from the bottom of a well very near Bear Lake, Utah. This well was about twenty feet in depth and the tooth was found in rather fine gravel. The tooth belonged to *E. primigenus*, judging from its size and the arrangement of the plates. It is interesting to note that the elephant lived at rather high elevations, as well as along the streams of the plains and the lower areas of North America. It is also

quite probable that there were highland or mountain species that have not been described.

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CURRENT NOTES ON METEOROLOGY.

SNOW CRYSTALS.

MENTION has already been made in these notes of the micro-photographic study of snow crystals which has been carried on for twenty years by Mr. W. A. Bentley, of Vermont. In the 'Annual Summary' of the *Monthly Weather Review* for 1902 (dated March 16, 1903), Mr. Bentley has a further contribution to this subject, in which he gives the results of his studies of snow crystals during the winter of 1901–02. The classification proposed by Hellmann ('Schneekrystalle,' Berlin, 1903, p. 38) is adopted as the best. It has been found that in general the great majority of perfect crystals are produced in the western, southwestern or northwestern portions of widespread snowstorms. The whole number of photographs of individual crystals taken by Mr. Bentley is now somewhat over 1,000, and no two are alike. This is doubtless the most complete collection in the world. The article contains 22 plates giving half-tone reproductions of 255 separate snow crystals—altogether a most beautiful collection.

STRUCTURE OF CYCLONES.

THE January number of the *Monthly Weather Review* contains a paper by Professor F. H. Bigelow on 'The Structure of Cyclones and Anticyclones on the 3,500-foot and 10,000-foot Planes for the United States.' In this paper charts are given showing, for the cyclones of January 2 and 7, 1903, the distribution of pressure and temperature at sea level, at 3,500 feet and at 10,000 feet. In reducing the station observations of pressure and temperature to the two high-level planes, Professor Bigelow used the tables prepared by him and published in his report on Barometry, a brief note on which appeared in SCIENCE for April 10, page 595. As Professor Bigelow says, these charts 'have special interest from the fact that this is the first exhibit of the isobaric systems in the upper air surrounding individual cyclonic and anticyclonic centers.'

R. DEC. WARD.
HARVARD UNIVERSITY.

BOTANICAL NOTES.

A NEW CLASSIFICATION OF PLANTS.

IN his new syllabus of the plant-families ('Syllabus der Pflanzenfamilien,' 1903), Engler makes a considerable modification of the system of plants which he has followed heretofore. In the edition of the 'Syllabus' which appeared in 1898, four branches ('Abteilungen') of the vegetable kingdom were recognized, as follows: (1) Myxothallophyta, (2) Euthallophyta, (3) Embryophyta Zoidiogama, (4) Embryophyta Siphonogama. The changes in the new edition consist in breaking up the Euthallophyta into ten branches, thus increasing the whole number from four to thirteen. This very materially changes the grouping of the algæ and fungi which make up the bulk of the Euthallophyta. The branch Myxothallophyta remains unchanged, except in minor details as to group names, and the same is true of Embryophyta Zoidiogama and Embryophyta Siphonogama.

The new grouping is as follows:

Branch ('Abteilung') 1. PHYTOSARCODINA (Myxothallophyta), with three classes, Acrasiales, Plasmodiophorales and Myxogastres.

Branch 2. SCHIZOPHYTA, with two classes, Schizomycetes and Schizophyceae.

Branch 3. FLAGELLATAE.

Branch 4. DINOFLAGELLATAE.

Branch 5. ZYGOPHYCEAE, with two classes, Bacillariales and Conjugatae.

Branch 6. CHLOROPHYCEAE, with three classes, Protococcales, Confervales and Siphoneae.

Branch 7. CHARALES.

Branch 8. PHAEOPHYCEAE.

Branch 9. DICTYOTALES.

Branch 10. RHODOPHYCEAE, with two classes, Bangiales and Florideae.

Branch 11. EUMYCETES, with five classes, Phycomycetes, Hemiascomycetes, Euascomycetes, Laboulbeniomycetes and Basidiomycetes.

Branch 12. EMBRYOPHYTA ASIPHONOGAMA, with two subbranches ('Unterabteilungen') as follows:

Subbranch Bryophyta, with two classes, Hepaticae and Musci.

Subbranch Pteridophyta, with four classes, Filicales, Sphenophyllales, Equisetales and Lycopodiales.

Branch 13. Embrophyta Siphonogama, with two subbranches, as follows:

Subbranch Gymnospermae, with six classes, Cycadales, Bennettitales, Cordiatales, Ginkgoales, Coniferae and Gnetales.

Subbranch Angiospermae, with two classes, Monocotyledoneae and Dicotyledoneae.

The significance of this rearrangement consists in the recognition of the greater relative importance of the lower groups of plants. There was a time, not many years ago, when eminent botanists regarded the flowering plants (Phanerogams) as coordinate with the lower plants bunched into one group (Cryptogams). Next, four groups—Thallophyta, Bryophyta, Pteridophyta and Spermatophyta—were recognized, the flowering plants (Spermatophyta) representing but one of the four great types of plants. Now we find in Engler's latest grouping that Spermatophyta are coordinate, not with one, or three, but with *twelve* other groups. This means that we no longer regard the morphological differences among lower plants as of merely secondary importance, but accord to them a value equal to that which they have in the flowering plants.

While one may bring serious objections to many details in this new system, there can be no doubt as to its usefulness in calling attention to the morphological differences among lower plants. In the consideration of the characters upon which the classification of plants depends botanists have generally given too much weight to those of flowering plants, and too little to those of the lower plants. This has made our systems top-heavy. In recent years tardy justice has been given to the fernworts (Pteridophyta) and mossworts (Bryophyta), but as for the fungi, lichens and algae, they have been thrown into a common heap of the 'thallus plants' (Thallophyta), in spite of the fact that they represent several well-marked great types. This mistake, at least, has not been made in Engler's new system. Here the lower types receive full recognition, and the higher are thereby reduced to something like their proper relative rank.

MORE MARINE BOTANY.

A few weeks ago mention was made of the opportunities for seaside laboratory work in botany at Woods Holl, Sandusky and on Vancouver's Island. To this list should be added the Biological Laboratory at Cold Spring Harbor, on the north shore of Long Island, which will be opened for its fourteenth session this year from the middle of June to the middle of September or later for investigators. There will be lectures from July 1 to August 15. In botany, courses are offered in cryptogamic botany, ecology and bacteriology. For a small number of investigators there are private laboratory rooms which may be obtained free of charge on certain conditions. Professor C. B. Davenport, of the University of Chicago, is the director.

AIDS TO THE STUDY OF THE FUNGI.

Professor Kellerman, of the Ohio State University, Columbus, is doing two things which will do much toward helping to increase the study of the fungi. The first is intended for the scientific worker, and consists of alphabetical lists of articles, authors, subjects, new species, hosts, new names and synonyms pertaining to North American fungi. Two such lists have appeared, the first representing the mycological literature of the year 1901, covering fifty-seven pages, and including nearly 1,000 citations, and the second representing the literature for 1902, and including about 1,400 citations. These lists are printed on one side of the page only, and so may be cut for card cataloguing purposes. The amount of work which these lists represent is quite appalling, and one can only wonder at the courage of the professor in undertaking it. That it will be of the greatest value to students of the fungi is at once obvious.

The other undertaking of the professor is the publication of a four-page leaflet under the title *Ohio Mycological Bulletin* for the benefit of beginners and amateurs in the study

of the fungi. It is to be issued 'from time to time,' and is sent for the nominal charge of ten cents for the year. All who send this sum are enrolled as members of the 'Ohio Mycological Club,' and from the lists already published this club is certainly a very live and active one, since it enrolled nearly 150 names in less than a fortnight. While intended for the beginner, these bulletins, of which two numbers have been issued, are of interest to the worker as well. Professor Kellerman is to be congratulated upon having so successfully launched this useful little publication.

CHARLES E. BESSEY.
THE UNIVERSITY OF NEBRASKA.

CORNELL WORK FOR AGRICULTURE.

THE president of Cornell University in a recent address before the College of Agriculture of that university gave a very admirable summary of the work of the college and its relations with the state.

The college was founded under the Land Grand Act of 1862 and is, under that act, a state college; but the state of New York has done nothing for it until within a few years, and the annual expenditures of the university on free scholarships for the state have exceeded the sum total of all the contributions of the state to the work. This address refers mainly to the work of the college and of the university in scientific fields and in promotion more or less directly of the agricultural interests of the state.

The university provides about eight hundred scholarships at a cost of about $250,000 per annum. Of these, six hundred are distributed to the one hundred and fifty assembly districts of the state. They are 'state scholarships.' The others are open to all and secured by competitive examinations. The annual cost of the College of Agriculture is $141,-061.27, as for the last fiscal year 1901–1902.

The state of New York does not appropriate a dollar of this nearly $400,000. It makes appropriations for the state colleges of forestry and of veterinary science, located at Cornell University but not its property, $35,000. It turns over to the university the less than $60,000 per annum coming in from the Land Grant Fund, which fund was the gift of the United States. It has built two buildings, which, however, remain the property of the state.

The College of Agriculture of Cornell University gives free tuition and has done so from the first. The students in regular course number about two hundred. There are enrolled in the Farmers' Reading Course 30,000 students; in the Farmers' Wives' Reading Course, 8,000; in the 1700 Junior Naturalists' Clubs, 30,000; in the Home-Study Courses about 15,000 teachers. Five hundred farmers have conducted experimental work on their own farms, under the supervision of the college. A correspondence school of large extent is carried on, which gives instruction to all agriculturists throughout the state. The experiment station has published 196 bulletins, of 20,000 in each edition, and 14 annual reports.

Members of the staff of the college are sent out whenever an outbreak of disease among either animals or plants is reported and, if familiar, it is extinguished; if unfamiliar, it is studied and a way found of preventing and curing it. In such an instance, that of the pear-sylla, a million dollars was saved to a single county, a few years ago.

This is work prescribed by the statutes and the charter of Cornell University. It is carried on mainly through the liberality, not of the state, but of Messrs. Cornell, Sage and other private contributors to the available funds of the university. Illinois, Iowa, Wisconsin and other states, similarly interested in agriculture, are providing handsomely for scientific work of this kind in their land-grant and state colleges. New York gains much, gives little.

Professor Robertson, Agricultural and Dairy Commissioner of the Dominion of Canada, after a three days' visit to Cornell, writes as follows:

"I do not know of another great university that is doing the same sort of work. Insti-

tutions of this kind generally confine their activities to the professional and scholastic classes, but here is one that is bringing its culture and its wealth of knowledge, based on careful research, to the help of the common people in their practical, every-day work."

R. H. Thurston.

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*THE INTERNATIONAL GEODETIC ASSOCIATION.**

The systematic reduction of the 52° parallel survey was published by the Central Bureau of the International Association under the title 'Lotabweichungen, Heft II.' The publication of the third part, which will contain the deflections along the northern geodetic lines of the 52° parallel survey, will be attempted this year.

Owing to the resignation of Dr. Schumann, who accepted the position of professor of geodesy, Fischer High School, the investigation of the curvatures of the meridians and parallels of the *'geoid'* could be but little advanced. Still, preparations for the computation of the triangulation through France, Spain and Algiers are in progress, and it is hoped that the final computations will be completed during the coming year.

Voluntary contributions of observations for variations of latitude during the year, from which to determine the motion of the earth's axis of rotation within its body, were received from only four observatories, namely, the observatories of Tokyo, Heidelberg, Leyden and Philadelphia. Unfortunately, the data thus furnished proved insufficient for an independent determination of the pole's motion. Utilizing these contributions, the results were compared with the motion of the pole as deduced from the series of special observations executed by the International Latitude Service, and it is gratifying to note that the comparisons proved the results to be satisfactory.

In this connection it remains to call attention to publication No. 6, of the Central Bureau, entitled 'Ergebnisse der Polhohenbestimungen in Berlin' during the years of 1889, 1890 and 1891, by Dr. Adolf Marcuse.

The work of the International Latitude Service made satisfactory progress during the year. Star-pairs were observed as follows:

Stations.	No. of Pairs Observed.	Observers.
1. Mizusawa	1,577	Kimura and Nakano.
2. Tschardjui	1,564	Medzwietsky.
3. Carloforte	3,386	Ciscato and Bianchi.
4. Gaithersburg	1,822	Davis.
5. Cincinnati	1,425	Porter.
6. Ukiah	2,014	Schlesinger.

The reduction of these observations was made immediately upon the receipt of the records by mail. In addition to these systematic computations, the Central Bureau also undertook the reduction of the *mean* declinations. The mean declinations were derived from Cohns' catalogue.

A list of the apparent declinations of the several stars thus observed, for the epoch of Greenwich culmination for the period November 2, 1902, to November 1, 1903, was prepared, and a copy sent to the observers for the purpose of enabling them to test and control their respective works by their own computations.

An abstract covering the most important results of this work is given by Dr. Albrecht in his article in No. 3808 of the *Astronomische Nachrichten,* entitled 'Resultate des internationalen Breitendienstes' for 1899.9–1902.0.

In this article Dr. Albrect calls attention to the fact that the motion of the earth's pole could no longer be satisfactorily represented by the expression:

$$\Delta\phi + v = x \cos\lambda + y \sin\lambda,$$

but that according to the suggestion of Professor Kimura in *Astrom. Nachr.*, No. 3783, an expression of the form

$$\Delta\phi + v = x \cos\lambda + y \sin\lambda + z$$

would have to be used instead. That is to say, the complete expression for the variation of latitude required an additional yearly term (z), wholly independent of the geographical longitude of the place of observation.

Determination of the Acceleration of Grav-

* Abstract of Professor Helmert's report on the activities of the Central Bureau of the International Geodetic Association during the year 1902, together with the proposed plan of work for 1903.

ity.—In accordance with the provisions of the plan of work for 1892, the measurements of gravity with the Italian pendulum, which on previous occasions had exhibited uncommon variations of length while swinging under diminished atmosphere pressure, were repeated, and it was found that the results for 1902 verified the results from the experiments of 1901.

The results from all these gravity experiments, which will be extended farther, if deemed necessary, in one or the other particular, will be published next year (1903).

Relative Gravity Determinations.—A comprehensive report on the relative determinations of gravity upon the Atlantic Ocean between Spain and South America has been published. The results found proved to be trustworthy, as also the newly determined relative results at the stations of Potsdam, Rio de Janeiro, Lisbon and Madrid, by means of the half-second pendulum. A new connection between the gravity stations at St. Petersburg and Potsdam is also contemplated. Moreover, Breteuil and other base-stations will also be connected by means of Stackraths' pendulum apparatus.

The commission also proposes to connect the Potsdam gravity station with their own pendulum apparatus and to determine the coefficients for air pressure and temperature. For the new Stackrath apparatus these coefficients were ascertained by adequate experiments at Rio de Janeiro. The constants of the four pendulums of Schumann (Strasburg), which have recently been materially remodeled, in order to improve them and render them less sensitive to variations of external conditions, will be determined.

Finally, it is proposed also to swing the pendulum at a series of stations in the high mountains of Central Asia, and to that end the trigonometric survey of India is bestowing particular care upon the determinations of the constants of temperature and air pressure for their own apparatus.

WILLIAM EIMBECK.

THE BRITISH ANTARCTIC EXPEDITION.

THE London *Times* publishes the following summary of the results of the National Antarctic Expedition contributed by a member of the scientific staff:

1. The discovery of extensive land at the east extremity of the great ice barrier.

2. The discovery that McMurdo Bay (?) is not a 'bay,' but a strait, and that Mounts Erebus and Terror form part of a comparatively small island.

3. The discovery of good winter quarters in a high latitude—viz., 77° 50′ S., 166° 42′ E.—with land close by suitable for the erection of the magnetic observations, etc. The lowest temperature experienced was 92° of frost Fahrenheit.

4. An immense amount of scientific work over 12 months in winter quarters, principally physical and biological.

5. Numerous and extensive sledge journeys in the spring and summer covering a good many thousand miles, of which the principal is Captain Scott's journey, upon which a latitude of 82° 17′ south was attained, and an immense tract of new land discovered and chartered as far as 83° 30′ south, with peaks and ranges of mountains as high as 14,000 feet.

6. The great continental inland ice reached westwards at a considerable distance from the coast and at an altitude of 9,000 feet.

7. A considerable amount of magnetic work at sea, also soundings, deep sea dredging, etc.

Captain Scott writes as follows:

We do not seem to have done much in any one particular direction, but I hope the sum total of our labors will not be displeasing to the societies. I must make a general apology for the sketchy nature of this note, which owing to the circumstances, has to be written in haste. When you receive it the matter will be decided, but as I write I am in considerable anxiety as to our prospects of getting out this season. It will be poor luck if we do not. We found one year's ice here last season; it broke away, and the spot remained open to the sea for at least six weeks; but we are now past the date at which it opened last season, and for this last fortnight little ice

has gone out, though in the past few days there have been renewed signs of a break up. The season is evidently very bad, and the weather is getting much colder and more blustering. Under these circumstances I am getting all the stores I can from the *Morning*, hoping to send her back to New Zealand in a week or so and to free ourselves at a later date. We shall be fully prepared for another winter, and I should not deplore it except as a waste of time. All our people remain as keen as possible. I think it would be difficult to imagine a happier or more comfortable community, considering how closely we are thrown together. If we get back this season it is my firm intention to do my best to raise money in the colonies for a third season, if the funds are not forthcoming from home. I think it would be difficult to praise Colbeck too highly for the manner in which he has followed our track, picked up our records, and found this ship; it has all worked out wonderfully well, but it must be appreciated what meagre information he had to work on, how intelligently he has followed the scent. The manner in which he and his ship's company lay themselves out to help us in every possible manner here is beyond all praise. We shall be quite comfortable, and I cannot think the harbor will remain closed for two seasons in succession.

THE BERMUDA BIOLOGICAL STATION.

The time for making application to work at the temporary biological station at Bermuda has been extended from June 1 to June 15. Till June 1, application may be made to Professor C. L. Bristol, University Heights New York City. After that to Professor E. L. Mark, 109 Irving St., Cambridge, Mass.

One hundred dollars provides first-class passage from New York to Bermuda and return, six weeks' board and lodging—but not washing—at the Hotel Frascati, Flatts, Bermuda, ample facilities for collecting the animals and plants of the coral reefs, lagoons and shores, and a table in a temporary laboratory furnished with the ordinary glassware, reagents and apparatus provided in modern marine laboratories. The building secured for the laboratory is well constructed and new.

If applicants are able to send information as to the subject or subjects on which they desire to work, it will aid the management in making better provision for their accommodation. It may be possible in some cases to provide the use of a certain number of books and monographs, if applicants indicate those which they can not themselves procure.

It should be understood that the opportunities offered are for investigation and that no formal instruction will be given.

E. L. Mark,
C. L. Bristol.

THE LAKE LABORATORY OF THE OHIO STATE UNIVERSITY.

The Lake Laboratory of the Ohio State University this summer will enter upon a new period of growth. The Cedar Point Pleasure Resort Company, which owns the long stretch of land bordering the east branch of Sandusky Bay has given a site for the new laboratory building in a most commanding and beautiful position where the laboratory will have at its very doors a magnificent stretch of Lake Erie beach, extended sand dunes, a native forest of cedars and other fine trees, an arm of the bay with good harbor for small boats and ready access to the larger bay and also an extensive swamp with a very varied vegetation.

The lease on this site runs for fifty years with privilege of renewal for a like term on the same conditions as to free rental, access of roads and freedom from buildings between laboratory and Lake front, and the Resort Company grants free transportation to students and workers at the laboratory on its steamers which, during the summer, ply between Sandusky and the resort two or three times per hour from early morning till late at night. The distance from the city being but two miles will make it possible to choose in the matter of living between the city boarding houses and the use of rooms in the labo-

ratory or tents, cottages or hotel accommodations available on the Point.

The new laboratory building which will accommodate at least one hundred students and investigators is already under construction under contract to be finished by June 15. This building includes four large laboratory rooms that will accommodate twenty to twenty-five students each in general work, two lecture rooms, four small laboratory rooms for special classes and rooms for about twenty research students or investigators, also private rooms for instructors, store room, dark rooms and other conveniences.

The location is about a half mile from the docks and buildings of the Pleasure Resort thus making it convenient to steamers and for mail, express, etc., but far enough away so that the work will not be interfered with by the patrons of the resort, nor will the virgin conditions of forest, beach and dunes be likely to suffer change for generations to come.

COMMITTEE ON THE PURITY OF CHEMICALS.

AT the last annual meeting of the American Chemical Society, held in Washington in December, a committee, consisting of Professors Baskerville, Dennis, Hillebrand, Talbot and the president of the society as chairman, *ex officio,* was appointed to investigate the question of the purity of chemicals sold as pure for use as reagents. It is held by many analytical chemists that the quality of the reagents as furnished by dealers is far from satisfactory, and below the grade sold some years ago. It is also well known that the designations 'C. P.,' 'Chemically Pure' and 'Strictly Pure' as employed by certain dealers are practically meaningless. The committee wishes to discover the extent of the evil complained of in order to be able to suggest a remedy. Chemists who are interested in the matter and who are acquainted with facts bearing on the subject are invited to communicate their information to Professor H. P. Talbot, Massachusetts Institute of Technology, Boston.

TYPHOID FEVER AT PALO ALTO AND STANFORD UNIVERSITY.

THE following are the facts in relation to the outbreak of typhoid fever in Palo Alto.

During the past winter, a dairy formerly of good repute, lying about four miles from Palo Alto, was leased to a Portuguese family. In this family, in March, a death occurred from typhoid fever. Two of the three houses stand on the bank of a brook which bounds the cattle yard. From this brook a wooden channel carries water to a large wooden trough within the yard. In this trough the cans and pails of the dairy were washed.

From the house, the excreta of the fever patient seem to have been thrown, Latin-fashion, on the ground, to be washed by the rains into the brook, and thence into the trough.

One of the milkmen supplying the town of Palo Alto bought milk from this Parreiro dairy. About April 6 cases of fever appeared in Palo Alto. The water supply of the town, as well as that of the university, from deep driven wells, was found above suspicion. This dairy was examined, bacilli were found in its milk, and on April 8 the milk route was closed. In this period, however, many people had taken the milk, and in the next three weeks there were upwards of 150 cases in the town, 80 of them being students of Stanford University.

On the university campus, a mile away, about 850 of the 1,480 students of the university live. Two fraternity houses on the campus were served with milk from Parreiro's. In one of these houses fourteen out of twenty persons were attacked. In the other four out of twenty. In the university dormitories, and in the remaining fraternities there have been a few cases, persons who had eaten at a Palo Alto restaurant or had been guests at some infected house.

About 110 cases have developed among the students of the university, and there have been four deaths, all in Palo Alto. The source of infection was promptly detected. The period of incubation, about three weeks, is now past; every care has been taken to pre-

vent secondary infection, and thus far there have been no cases from such infection.

There is no epidemic, no panic, and no 'infected' district. The chief lesson lies in the need of closer inspection of the habits and methods of dairymen and gardeners who come from the south of Europe.

SCIENTIFIC NOTES AND NEWS.

THE following fifteen candidates have been selected by the council of the Royal Society to be recommended for election into the society: Dr. William Maddock Bayliss, Professor Thomas William Bridge, Dr. Sydney Monckton Copeman, Mr. Horace Darwin, Mr. William Philip Hiern, Mr. Henry Reginald Arnulph Mallock, Professor David Orme Masson, Mr. Arthur George Perkin, Professor Ernest Rutherford, Professor Ralph Allen Sampson, Mr. John Edward Stead, Mr. Aubrey Strahan, Professor Johnson Symington, Professor John S. Townsend and Mr. Alfred North Whitehead.

M. DE FORCRAND has been elected a corresponding member of the Paris Academy of Sciences in the section of chemistry, in the room of the late M. Reboul.

THE contest of the election for the post of secretary to the Zoological Society of London has ended in an undoubted victory for the supporters of Dr. P. Chalmers Mitchell, who have occasionally been spoken of as the 'reform party.' The poll was unprecedentedly large and the numbers were: Mitchell, 530; Sclater, 336. Whatever views one may hold as to the respective merits of the candidates, it is at least satisfactory that the question has been settled in so definite a manner, as this will conduce to much greater stability in the future conduct of the society's affairs, and the storms that have raged over the contest are likely to calm down all the sooner.

PROFESSOR L. M. UNDERWOOD, of Columbia University, is still in Jamaica. He will visit Dominica and other islands of the Windward group, after which he will go to Europe to study ferns in English and continental botanical gardens and museums.

DR. J. PLAYFAIR MCMURRICH, professor of anatomy at the University of Michigan, has accepted a commission from the Royal Academy of Prussia and the government of Holland to examine and identify certain species of animal life.

DR. ARTHUR HOLLICK, assistant curator of the New York Botanical Garden, has received leave of absence for four months, with the object of investigating the fossil plants of Alaska in order to determine certain geological horizons through the aid of paleobotany.

HARLAN I. SMITH, of the American Museum of Natural History, has gone to North Yakima, Washington, where he has begun work on the archeology of the Columbia Valley in continuance of his general archeological reconnoissance of the northwest.

FOREST B. H. BROWN, a member of the senior class in the University of Michigan, has been appointed to conduct an investigation under the direction of the Michigan state geological survey of the plant societies of Monroe and Washtenaw counties, Michigan, with reference to their historical succession and their relation to water supply.

DR. GEORGE S. FULLERTON, professor of philosophy in the University of Pennsylvania, has gone to Germany and will spend the summer at Munich.

WE learn from *The British Medical Journal* that Mr. A. G. R. Foulerton has resigned the position of director of the Cancer Research Laboratories, a position which he has held for the last three years. The weekly board of the hospital has decided on the appointment of a director who will be required to devote the whole of his time to the work of the Cancer Research Laboratories. Mr. Foulerton will continue his service to the hospital as director of the Clinical and Bacteriological Laboratories.

MR. ANDREW CARNEGIE presided at the annual dinner of the British Iron and Steel Institute on May 8. Addresses were made by Mr. Balfour, the Duke of Devonshire, Sir Henry Campbell Bannerman and others.

THE following have been nominated as vice-presidents of the Royal Institution, London,

for the ensuing year: Sir Benjamin Baker, Sir Frederick Bramwell, Lord Halsbury, Dr. W. C. Hood, Lord Lister, Mr. George Matthey, Sir James Crichton Browne (treasurer) and Sir William Crookes (honorary secretary).

THE Association of American Physicians has elected the following officers: *President,* Dr. William T. Councilman, Boston; *vice-president,* Dr. Edward Trudeau, Saranac Lake, N. Y.; *recorder,* Dr. Solomon Solis-Cohen, Philadelphia; *secretary,* Dr. Henry Hun, Albany; *councilors,* Drs. Victor C. Vaughan, Ann Arbor, Mich., and George M. Kober, Washington, D. C.

THE Carnegie Institution has made a grant of $500 for a research assistant to Dr. M. Gomberg, junior professor of chemistry in the University of Michigan. Mr. Lee H. Cone, who has been doing graduate work in the university since September, 1902, has been appointed to that position for the year 1903–4.

The British Medical Journal states that Professor Zakharoff of the faculty of medicine of the University of Warsaw, and director of the Veterinary School of that city, is likely to fall a victim to his zeal for scientific research. In making a necropsy of the brain of a dog which had died of rabies, he inflicted a slight cut on one of his fingers, to which he paid no attention. About a fortnight later symptoms of hydrophobia appeared, and he was taken to the Pasteur Institute, which is under the direction of Professor Palmyski. There is said, however, to be no hope of Professor Zakharoff's recovery.

PRESIDENT PRITCHETT, of the Massachusetts Institute of Technology, is to give the commencement address at the University of Virginia on June 15.

PROFESSOR WM. T. SEDGWICK, of the Massachusetts Institute of Technology, recently gave the annual address before the alumni association of the medical department of the University of Buffalo, his subject being 'Protection of the Public Health by the Filtration of Municipal Water Supplies.'

THE Wild Flower Preservation Society of America held a meeting under the auspices of the Olivia and Caroline Phelps Stokes Fund for the Protection of Native Plants in the Museum Building of the New York Botanical Garden on May 16, when Mr. Charles Louis Pollard delivered an illustrated lecture on 'Vanishing Wild Flowers.'

PROFESSOR G. ROMITI, of Pisa, celebrated on March 5, the twenty-fifth year of his incumbency of the chair of anatomy at Siena and Pisa. He was presented with a souvenir volume of the 'Archivio Italiano di Anatomia ed Embriologia' and a gold medal.

THE hundredth anniversary of the birth of Liebig was celebrated on May 12 by the University of Giessen and the Technical School of Darmstadt.

THE London *Times* states that a representative committee has been formed for the purpose of raising a memorial to the late Sir Henry Bessemer. The extraordinary industrial development of the world in recent years is largely due to the metallurgical process which bears the name of Bessemer, and it has long been felt that his life's work should be suitably commemorated in the center of the British empire. The objects of the memorial are as follows: (1) The erection (and, if necessary, the endowment) of metallurgical teaching and research work in connection with the University of London, equipped for the testing of ores and metallurgical products by modern methods and for the investigation of new methods and processes. (2) The foundation of international scholarships for post-graduate courses in practical work in connection with proposals now under the consideration of the board of education. The committee includes leading representatives of the metallurgical, engineering and mining industries and professions, and of education authorities. A meeting to inaugurate the fund will be held at the Mansion-house on June 29 next, particulars of which will be published later.

MR. ABRAHAM FOLLETT OSLER, known for his work in meteorology, died at Birmingham on April 26, at the age of ninety-five years. He had been a member of the Royal Society since 1855.

We regret also to record the deaths of Dr. C. H. Dufour, professor of astronomy in the University of Lausanne; of M. René Mammert, professor of chemistry at the University of Freiburg in Switzerland; of Dr. Clemence von Kahlden, professor of pathological anatomy at Freiburg i. B.; and of Dr. Heinrich Hartel, formerly professor of geodesy at Vienna.

The American Institute of Electrical Engineers held its annual meeting in New York City on May 19.

The fifteenth international medical congress will be held at Lisbon in 1906 with Professor Alfredo da Costa as president.

The government has introduced a bill in the Swedish *Riksdag* granting about $50,000 for the equipment of a vessel to be sent to the relief of the Nordenskjold Antarctic expedition.

Oswald Wiegel, of Leipzig, will sell at auction on June 11–13 the library of the late Dr. Julius Platzmann, which contains some fourteen hundred works on American languages, especially on the languages of South America.

During the last field season Mr. Whitman Cross, of the United States Geological Survey, visited the Hawaiian Islands for the purpose of observing the results of volcanic activity at Kilauea. Critical comparisons were made between the modern volcanic rocks of these islands and the areas of old volcanic rocks occurring in the Rocky Mountain country. The larger islands of the group were all visited, advantage being taken of this opportunity to gather data for use in planning future work in Hawaii by the Geological Survey.

A press despatch from Washington, dated May 13, says: "The executive committee of the Carnegie Institution reports that the entire sum of $200,000 allotted to grants for original research has been distributed, and that of the $40,000 set aside for publications to be made this year $20,000 has been assigned to special publications, leaving $20,000 still at the disposal of the executive committee. No more grants for researches will be made until after the next meeting of the board of trustees, which will be held in December. At the meeting of the executive committee today the question of giving more publicity to the grants of the institution was not taken up. The policy hitherto has been to permit the receivers of grants to make them public, but for the officials of the institutions to refrain from giving out names of the fortunate scientists who receive these grants. It is probable that this policy will be continued."

A chapter of the university scientific society of the Sigma Xi has recently been established at the University of Chicago. Chapters of this society are now maintained at the following universities: Cornell, V. A. Moore, president; Union, O. H. Landreth, president; Kansas, F. H. Snow, president; Rensselaer, W. P. Mason, president; Yale, J. P. Tracy, president; Brown, W. W. Bailey, president; Nebraska, L. Bruner, president; Minnesota, J. J. Flather, president; Iowa, T. H. McBride, president; Ohio, W. R. Lazenby, president; Pennsylvania, E. F. Smith, president; Stanford, V. L. Kellogg, president; California, C. L. Cory, president; Columbia, J. F. Kemp, president; Chicago, H. H. Donaldson, president.

The International Mathematical Congress will meet at Heidelberg in August of next year.

It is expected that the International Electrical Congress will be held at St. Louis, during the week beginning September 12, 1904. It will thus immediately precede the International Congress of Arts and Sciences.

A meeting of the committee of the Central International Bureau for the Prevention of Consumption was held in Paris on May 4 and 5 to make preliminary arrangements for the next international congress, which is to take place at Paris in October, 1904.

A cablegram from Paris to the daily papers states that the airship constructed for the Lebaudy Brothers made a highly successful trip on May 8 under Pilot Juchmes and Engineer Rey. The start was made at 9 A.M. from St. Martin during a light rain and with a brisk wind blowing. The dirigible airship

passed over a number of suburban towns. At Mantes the airship made a circle around the cathedral spire and on leaving that town went diagonally against the wind. Over Limay, Mantes and Rosny the airship was put through a series of evolutions and answered her helm and manoeuvred to the perfect satisfaction of all interested in her. She then returned to her point of departure, where she descended without accident. The distance covered was 37 kilometers in one hour and thirty-six minutes, against Santos-Dumont's record for the Deutsch prize of 11½ kilometers in thirty minutes.

AT the twenty-fifth annual general meeting of the Institute of Chemistry, Professor J. M. Thomson, F.R.S., the retiring president, delivered an address in which he sketched the history and work of the institute since its foundation. He said that the real origin of the institute was in a suggestion put forward in 1872 by the late Sir Edward Frankland, at a dinner given to Professor Cannizzaro on his appointment as Faraday lecturer. Later, in 1876, he proposed to the council of the Chemical Society that a class of fellows, to be styled licentiates (or some analogous title), should be created for the purpose of distinguishing between competent professional chemists and those who professed an interest in chemistry as a science, and not as a means to earning a livelihood. The idea was not adopted, but it was decided to found a new society, and the Institute of Chemistry was formally incorporated under the Companies Act on October 2, 1877. Among those active in founding the institute were Mr. Carteighe, Professor Hartley, the late Mr. Frederick Manning, Mr. Charles Tookey and the late Dr. Alder Wright. Professor Thomson himself was also a keen worker for the institute in its earliest history. He proceeded to relate its progress under the successive presidents: Sir Edward Frankland, Sir Frederick Abel, Dr. William Odling, Dr. James Bell, Professor W. A. Tilden, Dr. W. J. Russell and Dr. Thomas Stevenson. He dealt with the regulations as to training and examination of candidates for the associateship of the institute, showing how the standard of the requirements for membership had been steadily raised, and he commented on the consequent increasing recognition of the qualifications 'A.I.C.' and 'F.I.C.' by government and municipal authorities and by the leaders of industry throughout the kingdom. The annual report of the institute drew attention to the increase in the number of members, in spite of the fact that there had been heavy losses through death. Attention was also called to the increase in the number of candidates for examination, notwithstanding that within the last few years the standard of admission had been considerably raised. The adoption of the report was seconded by Dr. Thomas Stevenson, and carried. The newly-elected president, Mr. Thomas Howard, then took the chair.

WE learn from the London *Times* that a recent cablegram from Captain Colbeck brings the information that, when he discovered the position of the winter quarters of the expedition in McMurdo Bay, the ice prevented him from bringing the *Morning* nearer than eight miles to the *Discovery*. The transshipment of coals and provisions had, therefore, to be done by means of sledges dragged over that distance. Nor was this the only difficulty. On completion of the transshipment the distance had been reduced to five miles, showing that, in addition to the hard work of transshipment, there must have been much trouble with the ship in moving her about at the edge of the ice as it broke away. The failure of the provisions on board the *Discovery*, the particulars of which have not yet been received, made it necessary for the *Morning* to transfer a much larger quantity of provisions than was intended, and this will entail large additional expense. It is now clear that it would have been quite impossible for the *Discovery* to return this year. But she is only provisioned until next January, so that the despatch of the *Morning* for her relief a second time is an absolute necessity in order to avoid a catastrophe. For the additional expense a sum of £12,000 is urgently needed, £6,000 this year, and the rest next year.

UNIVERSITY AND EDUCATIONAL NEWS.

Mr. Henry Denhart, of Washington, Ill., who has in the last five years given $35,000 to Carthage College, announces a further gift of $145,000 on certain conditions. He offers $100,000 for the endowment fund providing that the same amount be raised in the college territory, half of the expense of any new buildings erected up to $20,000, and $25,000 cash.

Plans have been completed for the new engineering building of the University of Pennsylvania, which will be located opposite Dental Hall, and will be completed in September, 1904, at a total cost of $500,000. The building is to be 300 feet long and 175 feet deep, with an exterior of dark brick and sandstone trimmings.

The chair of electrotechnics at University College, Liverpool, has been endowed with £10,000 by Mr. Jardine.

University Inn, at State College, Pa., was destroyed by fire on May 9, causing a loss of about $35,000; insurance, $13,000. The inn was occupied by thirty-five students of the State College, and seven professors and their families.

A meeting of educators representing principally the colleges of the middle west met at Chicago on May 8 and 9 to discuss the college and its relation to the professional schools. A national college association was formed which will hold annual conferences.

The Yale University Corporation at the May meeting approved the recommendations of the academical professors to extend the elective system into the freshman year by allowing each freshman to choose five out of eight courses of study and to allow the substitution of advanced work in mathematics or modern languages in place of Greek for admission to college. The new requirements for admission, which will go into effect in 1904, leave English, ancient history and Latin unchanged, but will allow Greek to be wholly or in part superseded by an additional amount of mathematics or by a thorough knowledge of either French or German. In the freshman year the eight courses open to the class, five of which must be elected, are Greek, Latin, French, German, English, mathematics, chemistry and history. It is required that three of the five courses elected must be in continuation of the five studies—Greek, Latin, English, mathematics, or a modern language —already pursued in the preparatory school.

The Rev. Edwin H. Hughes, of Malden, Mass., has been elected president of De Pauw University, at Greencastle, Ind.

Professor William H. Brewer has resigned the professorship of agriculture at Yale University and has been appointed professor emeritus.

Mr. Gifford Pinchot, chief of the Bureau of Forestry, has been elected to a professorship in the forest school of Yale University. He will continue his work and his residence in Washington, but by special arrangement will lecture at Yale. Assistant Professor J. W. Toumey has been advanced to a full professorship in the Forest School.

At Cornell University Professor T. F. Hunt, dean of the Agricultural College, of the Ohio State University, has been appointed professor of agronomy and Dr. B. F. Kingsbury has been appointed assistant professor of embryology. Dr. Kingsbury was formerly instructor and has spent the last two years in study at Freiburg.

At Harvard University Messrs. A. F. Blakeslee and J. J. Wolfe have been appointed Austin teaching fellows in botany.

Philip Bouvier Hawk, M.S., for the past two years assistant in physiological chemistry at Columbia University, has resigned his position to accept that of demonstrator of physiological chemistry at the University of Pennsylvania.

Mr. Howard S. Reed, assistant in plant physiology in the University of Michigan, has been appointed instructor in botany at the University of Missouri.

M. Charrin has been apointed to a newly-established chair of general pathology in the Collège de France; Dr. Flügge, of Breslau, has been appointed professor of hygiene in the University of Vienna.